



**Project Preparation Consultancy Services for Preparing Detailed Project Report (DPR) for Various Road Improvement Works Under Tamil Nadu Road Sector Project II (TNRSP II) – Contract PPC 03**

**Volume VII Part I  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
FOR PHASE-I ROADS**



TNRSP

**CDM  
Smith**

CDM Smith India Private Limited

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- ❑ Thiruchengode – Paramathy Section of Road No. 2 (SH 86)
- ❑ Malliyakarai – Rasipuram & Rasipuram – Thiruchengode Sections of Road No. 4 (SH 79)
- ❑ Mohanur - Namakkal Section of Road No. 5 (SH- 95)

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## Abbreviations

AADT	Annual Average Daily Traffic
AMSL	Above Mean Sea Level
CMC	City Municipal Council
CO <sub>2</sub>	Carbon dioxide
CPCB	Central Pollution Control Board
CPR	Common Property Resources
dB	Decibel
DIZ	Direct Impact Zone
DPR	Detailed Project Report
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FMB	Field Measurement Book
GoI	Government of India
IIZ	Indirect Impact Zone
Km	Kilometer
TNPCB	Tamil Nadu Pollution Control Board
MoEF&CC	Ministry of Environment, Forests and Climate Change
TNRSP	Tamil Nadu Road Sector Project
NABARD	National Bank for Agricultural
NGO	Non-Governmental Organization
NOC	No Objection Certificate
NO <sub>x</sub>	Oxides of Nitrogen
OP	Operational Policy
PAPs	Project Affected Persons
PCU	Passenger Car Unit
PIU	Project Implementation Unit
PIZ	Project Impact Zone
PWD	Public Work Department
R&R	Resettlement and Rehabilitation
RoW	Right of Way
SEAC	State/Union territory Level Expert Appraisal Committee
SEIAA	State/Union territory Level Environmental Impact Assessment Authority
TMC	Town Municipal Council

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# Executive Summary

## E.1. Background

Government of Tamil Nadu (GoTN) has decided to improve the State Highways in the State of Tamil Nadu with financial assistance from the World Bank under the Tamil Nadu Road Sector Project (TNRSP). The GoTN has now taken up the up-gradation, maintenance and improvement of selected roads under TNRSP-II program. Roads considered under TNRSP II are divided in to five Packages i.e., PPC01, PPC02, PPC03, PPC04 and PPC05. M/s CDM Smith India Private Limited has been entrusted by GoTN for the task of carrying out the Feasibility Studies and preparation of Detailed Project Report including Environmental and Social Impact Assessment for upgradation, maintenance and improvement of road network under package PPC03. Package PPC03 consists of 7 project roads of total length 421.44 Km. Out of these seven roads, four sections of three roads are selected as Phase-I roads under TNRSP-II, which will be implemented immediately. Details of the Phase-I roads under TNRSP-II are presented in **Table E.1**.

**Table E.1. Details of Phase-I Roads under TNRSP-II under PPC03**

Road No.	Project Road	Phase-I Road Sections	Starting	Ending	Length in Km
2	Omalur - Sankari - Tiruchengode - Paramathy road (Km 45+200 to Km 81+000 of SH86)	Thiruchengode - Paramathy Section	Meenkinaru near Tiruchengode at Km 54+800 where proposed Tiruchengode bypass intersects SH 86	Paramathy at Km 80+100	26.2
4	Malliyakarai - Rasipuram - Tiruchengode - Erode Road (Km 0+000 to Km 94+660 of SH79)	Section I: Malliyakarai – Rasipuram Section	Malliyakarai at Km 0+000 where SH79 intersects SH30 (Km 81+000)	Near Namagiripettai at Km 30+600 where proposed Rasipuram bypass starts	30.6
		Section II: Rasipuram - Thiruchengode Section	Ponkurichi at Km 51+400 where proposed Rasipuram bypass ends	Mettupalayam at Km 71+280 where proposed Tiruchengode bypass starts	19.9
5	Mohanur – Namakkal – Senthamangalam - Rasipuram Road (Km 0+000 to Km 54+000 of SH95)	Mohanur – Namakkal Section	Mohanur town at RUB of Velur-Mohanur Road MDR 547 (Km 15+800)	Laddiwadi at Km 13+300 where proposed Namakkal Outer Ring Road intersects SH95	13.35

## **E.2. Objective of the Assignment**

The main objective of the project is to alleviate the current unsafe and congested conditions of the road network connecting the villages and towns by providing better quality and safe roads to the users in a sustainable and environment friendly manner. The major objectives of this study are stated below:

- To present to decision makers a clear assessment of potential impact associated with the proposed project intervention,
- To apply a methodology which assesses and predict potential impacts and provides a) the means for impact prevention and mitigation, b) the enhancement of project benefits, and c) the minimization of long-term impacts;
- To provide a specific forum in which consultation is systematically undertaken in a manner that allows stakeholders to have direct input to the environmental management process.
- To assess the analysis of alternatives to bring environmental considerations into the upstream stages of development planning as well as the later stage of site selection, design and implementation, and
- To recommend the environmental management measures to reduce adverse impacts.

## **E.3. Scope of Environmental Assessment**

The environmental assessment scope includes screening and scoping, environmental assessment and environmental management plans for the individual project roads as required. The EA process also envisages developing a comprehensive environmental management framework for the entire project, which will be adopted as part of the environmental policy for Tamil Nadu Road Sector Project-II.

## **E.4. Description of Project Roads**

Out of seven roads, three roads are considered as Phase-I roads under TNRSP-II, which will be implemented by project proponent on priority. Details of Phase-I roads under TNRSP-II under PPC03 are presented in **Table E.1**. The project envisages the improvements of Phase-I roads under TNRSP-II from existing two lane with earthen shoulder to two lane with paved shoulder configuration based on the lane requirements, type of land use and terrain and availability of land & maximum utilization of existing pavement. Based on the traffic assessment report and available RoW, TNRSP has formulated eight typical cross sections without compromising the provisions of Manual and terms of reference (ToR). The proposed improvement includes the widening of the project roads as per the traffic warrants, strengthening / reconstruction of the existing pavement for the entire length, provision of footpath cum drain at built-up locations, improvement / redesign of sharp curves, widening / reconstruction of existing culverts and provision of additional culverts depending on the drainage condition, junction improvements, provision for pedestrian crossing facilities, provision of traffic signs and road furniture, provision of bus shelters, and shifting of utilities. There are total ten minor realignments proposed for the Phase-I roads under TNRSP-II to overcome the geometric deficiency and to attain the desired design speed. No bypass requirement is envisaged for the Phase-I roads under

TNRSP-II since GoTN has considered bypasses for major built-ups (except for Tiruchengode), along the Phase-I roads under TNRSP-II under a separate scheme with NABARD financial assistance. The bypass for Tiruchengode is proposed to be taken up along with Phase-II roads under TNRSP II.

## E.5. Key Environmental Laws and Regulations

Table E.2 presents the environmental regulations and legislations relevant to project roads.

**Table E.2. Environmental Regulation and Legislations Applicable to the Subject Project**

Sl. No	Type of Clearance	Statutory Authority	Applicability	Project Stage	Time Required	Responsibility
1	Tree felling permission	District Collector & Forest Department	Felling of avenue trees	Pre construction	1 month	GoTN/ TNRSP
2	Consent to Establish under Air and Water Acts	Tamil Nadu Pollution Control Board	For establishing Hot mix plants, Crushers and batching plants	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
3	Consent to Operate under Air and Water Acts	Tamil Nadu Pollution Control Board	For operating Hot mix plants, Crushers and batching plants	Construction (Prior to work initiation)	1-2 months	Concessionaire / Contractor
4	Permission to store Hazardous wastes	Tamil Nadu Pollution Control Board	Storage, Transportation & Disposal of Hazardous Wastes	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
5	Explosive license	Chief Controller of Explosives of the Petroleum & Explosive Safety Organisation	Storage of explosive materials and Petroleum products	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
6	PUC certificate for vehicles for construction	Transport Department of Tamil Nadu	For all construction vehicles	Construction (Prior to work initiation)	1-2 months	Concessionaire / Contractor
7	Quarry lease deeds and	Mines and Geology	Quarrying and borrowing	Construction (Prior to	2-3 months	Concessionaire / Contractor

Sl. No	Type of Clearance	Statutory Authority	Applicability	Project Stage	Time Required	Responsibility
	license	Department of Tamil Nadu	operations	work initiation)		
8	NOC for water extraction for construction and allied works	Central Ground Water Authority	Ground water extraction	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor

## E.6. Baseline Environment

Data was collected from secondary sources for the macro-environmental setting like climate, physiography (Geology and slope), biological and socio-economic environment within Project Influence Area (PIA) / Project Districts. Firsthand information has been collected to record the micro-environmental features within Corridor of Impact (CoI). Collection of first hand (Primary) information includes preparation of base maps, extrapolating environmental features on proposed road design, tree enumeration, location and measurement of socio-cultural features abutting project road.

## E.7. Stakeholder Consultation

Considering the fact that involving local communities in the project planning is basis of the participatory planning, stakeholder consultations at various levels were conducted during different stages of the project. Suggestions and options given by the people improves technical and economic efficiency of the project and suggested improvement proposals of the people (if adopted by the project) also generates sense of ownership within communities thus eases implementation process. Stakeholder consultations conducted for the project comprised one-to-one interviews, focus group discussions and structured public consultation meetings. The stake holder consultations were conducted before project design and after project design. The suggestions obtained during pre-design consultation were considered in the project design. The designs were further modified based on the suggestions obtained during post-design consultations.

## E.8. Information Dissemination

- The consultant has conducted information dissemination by one to one campaigning about proposed improvement.
- Potential project affected families were consulted to inform them about proposed road improvement program and possible environmental conflict such as tree cutting, relocation of utilities.
- Structured consultation was conducted at hot spots along the project corridors for information dissemination and collecting the opinion / suggestion from the public.
- Pictorial Methods were adopted to explain proposed improvement and possible environmental impacts in the concerned villages.

## **E.9. Analysis of Alternatives**

It is customary to include a ‘No Action alternative’ in order to confirm that the project upgradation is a requirement of the people of Tamil Nadu and hence need to be implemented. The project roads are important highway for the overall development of the State. The ‘no action alternative’ will not allow any of these improvements therefore cannot be acceptable to the local people.

The ‘no action alternative’ will not resolve this issue; on the other hand, due to the standard improvements to the project road it is most likely that the project road will serve as a much safer road for the commuters. Considering the land use, environmental features, road geometry etc., optimum levels of improvements have been proposed for the project roads.

Realignments have been considered at ten locations along the project roads where geometric deficiencies occur.

## **E.10. Potential Impacts**

### **E.10.1. Potential Negative Impacts of the Project during Construction Phase**

The activities during the construction phase of the project road includes leveling of site, clearing of trees along the alignment, widening of existing road with paved shoulders, construction of culverts and bridges, and quarry operations for the road work. Some of the potential direct and indirect negative impacts of the project during construction phase will be the following.

- Filling in low-lying areas for embankments of the road.
- Cutting of trees.
- Loss of topsoil due to clearing and grubbing of vegetation for new alignment, borrow area and quarry operation, construction camps and material stacking yard.
- No considerable impacts on flora and fauna due to the construction activities.
- Temporary impact on the drainage pattern due to embankment, culvert and bridge constructions.
- No considerable Impact on traffic management system will happen.
- Increased air pollution (including dust) only during project road construction.
- Increased noise levels due to the movement of construction vehicles and construction activities.
- Bare minimum soil erosion leading to loss of top soil and pollution of surface water bodies.
- Spillage of oils and other hazardous materials may lead to pollution of surface and sub-surface waters depending upon the quantity of spillage.
- No considerable Pollution of rivers and canals due to construction of bridges and culverts.

### **E.10.2. Potential Negative Impacts of the Project during Operation Phase**

During the operational phase of the project, traffic in the project road and the average speed of vehicles will increase. Some of the potential direct and indirect negative impacts of the project during operation phase are the following.



- Increased noise pollution along the project roads if the traffic volume increases and if the vehicles moves at a speed more than the prescribed speed
- Minimum Impact on natural drainage pattern of the project area
- Pollution of water bodies and impacts on its ecosystem if hazardous chemical or oil spill into the canals and streams

### **E.10.3. Potential Positive Impacts of the Project**

The positive impacts of the project are:

- Reduction in air pollution and accidents along the project roads due to reduction in traffic congestion and smooth vehicular movement due to widening of the roads and provision of parking areas.
- Reduction in fuel consumption and travel time due to better service level of roads
- Improved safe and efficient connectivity between the project districts.
- Generation of local employment during road construction
- Improvement of local economy and industry due to better infrastructure facilities

### **E.10.4. Cumulative Environmental Impact of the Project**

The overall effects caused by the sum of past, present and foreseeable future actions of the current project in combination with the actions of other projects are assessed. Different projects that are proposed or ongoing in the project region are identified and an attempt is made to assess the cumulative impacts of these projects on traffic, road safety and valued ecosystem components.

The programme for all the identified projects is not currently known, so it is not possible to predict the level of disruption that may occur. However, if all these projects occur simultaneously, there could be significant cumulative impact. Though it is very unlikely that all the projects will take off at a time, never the less the contractor should be aware of other project activities in the region and plan his activities in a way to reduce impact. Traffic management measures and environmental impact mitigation measures proposed in Chapter 8 of this document and also in EMP will ensure effects are insignificant.

## **E.11. Avoidance, Minimization, Mitigation & Enhancement**

Prevention or avoidance of impact is better than mitigation of impact. Hence, avoidance and reduction of adverse impacts approaches were adopted during the design stage through continued interaction between the design and environmental teams. This is reflected in the designs of the horizontal & vertical alignment, cross sections adopted, construction methods and construction materials. In-depth site investigations have been carried out so that sensitive environmental resources are effectively avoided, leading to the environmentally best-fit alignment option.

## **E.12. Environmental Management Action Plan**

Environmental Management Action Plan (EMAP) deals with the implementation procedure of the guidelines and measures recommended to avoid, minimize and mitigate environmental impacts of the

project. It also includes management measures suggested for enhancement of the environmental quality along the highways.

The institutional arrangement made under project will look into the implementation of project as well as EMAP and the various legal settings applicable to the project are briefly stated in **Chapter 3**.

The avoidance, mitigation & enhancement measures for protection of the environment along highways have been discussed. Although the social environmental impacts, its mitigation and management are essential component of the EMAP, this report excludes it for the purpose of clarity and procedural requirements. Social environmental elements have been separately dealt in separate volume namely, Resettlement and Rehabilitation Action Plan (RAP).

### E.12.1. Objective of EMAP

The EMAP is a plan of action for mitigation / management / avoidance of the negative impacts of the project and enhancement of the project corridor. For each measure to be taken, its location, timeframe, implementation and overseeing / supervision responsibilities are listed. These components of the EMAP have been given in separate EMP Reports for each project road which explains the environmental issues and the avoidance/ mitigation/ minimization or enhancement measures adopted and/or to be adopted during different phases of the project. It also provides the references for the suggested measures, responsible agency for its implementation / management as well as its timeframe.

### E.12.2. Cost Estimates for Environmental Management

Mitigation measures proposed in the EMAP will be implemented by the Contractor. The works to be undertaken by the Contractor have been quantified and the quantities included in the respective BOQ items such as earth works, slope protection, noise barriers, road safety features, and tree plantation.

Provisional quantities have also been included for additional measures that may be identified during construction and for silt fencing which will depend on the Contractors work methods and site locations. Items and quantities have also been included for enhancement measures.

More general environmental management measures to be followed by the contractor have been included in the specifications and the EMAP. These cannot be quantified and are to be included in the contract rates. The budget for the environmental management for the Phase-I roads under TNRSP-II is summarized in **Table E.3**.

**Table E.3. Summary of Environmental Management Cost for Phase-I Roads under PPC03**

Sl No	Name of the Road Section	EMP Cost in Rs.	
		For TNRSP	For Contractor
1	Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	27,88,000	3,23,87,372
2	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	27,88,000	4,33,12,249
3	Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)	27,88,000	2,99,89,076
4	Mohanur to Namakkal Section of Road No. 5 (SH 95)	27,88,000	2,52,94,558

### E.12.3. Organizational Framework

The proposed project will be implemented by TNRSP through its Environmental Management Unit (EMU). The EMU comprises of officers from Department of Forest, GoTN, and other Environmental Engineers. The EMU will be coordinating with the field level implementing agencies such as

Engineer (Supervision Consultant), Contractor and field level Highways Department (HD) officials.  
Role and responsibilities of important officials are detailed in the EMP Report.

# Chapter 1. Introduction

## 1.1. Background

Government of Tamil Nadu (GoTN), on behalf of TNRSP has decided to improve the roads of around 2,050 Km in the State of Tamil Nadu. Under Tamil Nadu Road Sector Project Phase-I (TNRSP-I), World Bank assisted Project. GoTN has improved the State Highways for a length of about 1,800 Km under various improvement programs such as upgradation, enhanced periodical maintenance, performance based maintenance and Public Private Partnership on pilot basis was also taken up.

GoTN has now mooted a second phase of works namely Tamil Nadu Road Sector Project-II (TNRSP-II). The TNRSP-II is expected to cover upgradation, maintenance and improvement of the identified core road network and the project is divided into 5 packages namely PPC01, PPC02, PPC03, PPC04 and PPC05. The improvement mechanism consists of widening and strengthening of existing two lane carriageway to two lane with paved shoulder/ four lane or six lane depending upon the traffic assessment and pavement strengthening along with drainage facility, road furniture and accessories. In some cases new alignments and/or re-alignments would be required.

Keeping in view the objective of such an exercise, TNRSP commissioned M/s CDM Smith India Private Limited, Bangalore to undertake the study of road network under package PPC03 as an endeavour to dwell upon appropriate technologies and bring in sophistication in the approach to this Study. The task of study involves carrying out the Feasibility Studies, Environmental and Social Impact Assessment including preparation of Detailed Project Report for upgradation, maintenance and improvement. Corridors under package PPC03 as per the Contract Agreement are given in **Table 1.1** and the Location map is depicted in **Figure 1.1**.

**Table 1.1. Details of Project Roads under TNRSP-II PPC03**

Road No.	Project Road	Length in Km
1.	Omalur - Sankari- Tiruchengode - Paramathy road (Km 0/000 to Km 45/200 of SH86)	46.00
2.	Omalur - Sankari - Tiruchengode - Paramathy road (Km 45/200 to Km 81/000 of SH86)	34.90
3.	Omalur - Mecheri Road (Km 0/000 to Km 14/600 of MDR: M307)	14.60
4.	Malliyakarai - Rasipuram - Tiruchengode - Erode Road (Km 0/000 to Km 94/660 of SH79)	96.06
5.	Mohanur – Namakkal – Senthamangalam - Rasipuram Road (Km 0/000 to Km 54/000 of SH95)	54.00
6.	Thoppur - Mettur - Bhavani - Erode Road (Km 0/000 to Km 93/980 of SH20)	93.98
7.	Trichy - Namakkal Road (Km 0/000 to Km 77/400 of SH25)	81.90
<b>Total Length of the PPC03 Project Roads in Km</b>		<b>421.44</b>

## 1.2. The Project

### 1.2.1. Project Description

Out of seven roads in PPC03, four sections of three roads are considered as Phase-I roads under TNRSP-II. Details of road sections selected as Phase-I roads under TNRSP-II program are given in **Table 1.2**.

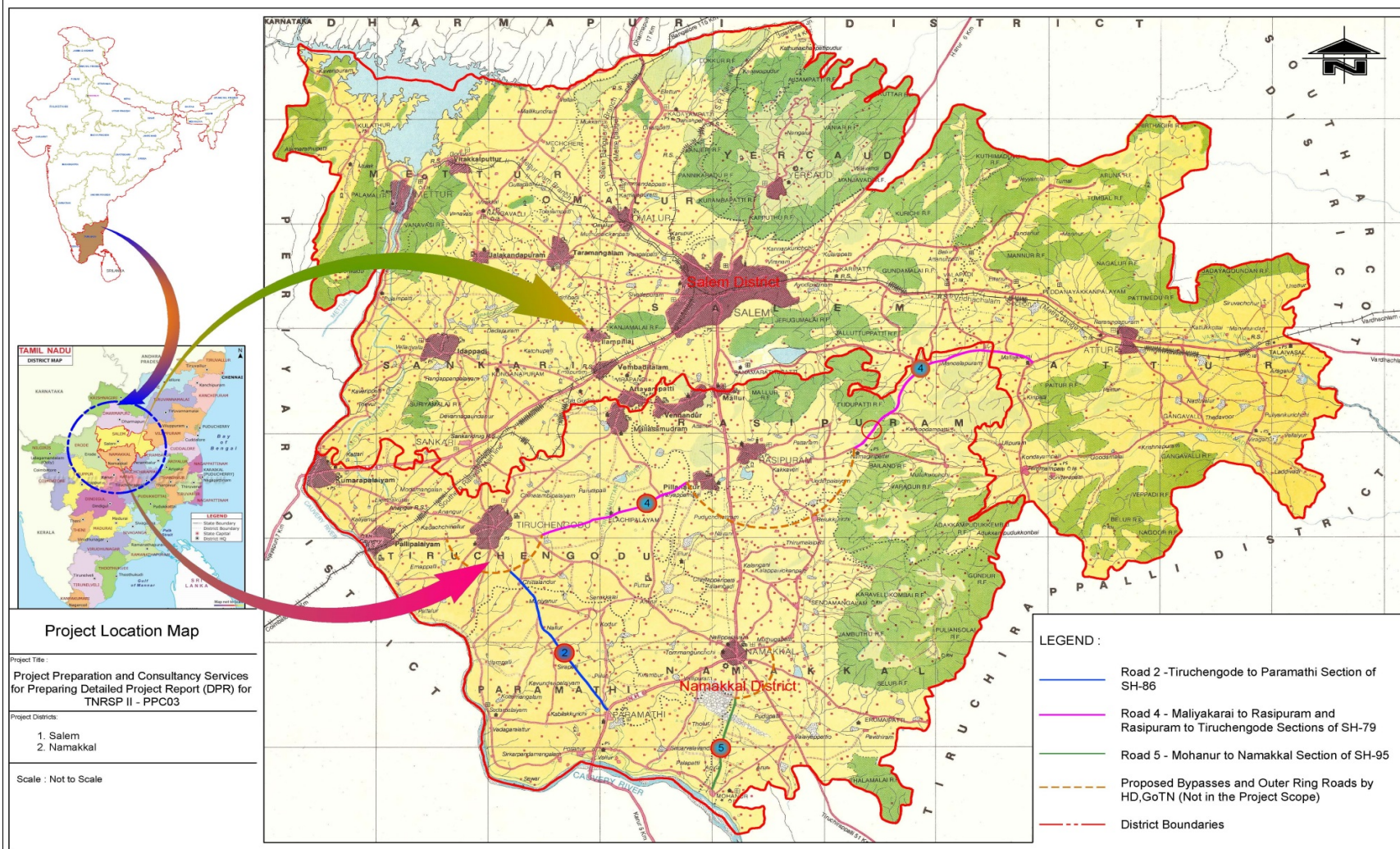
**Table 1.2. Details of Phase-I Roads under TNRSP-II under PPC03**

Road No.	Project Road	Phase-I Road Sections	Starting	Ending	Length in Km
2	Omalur - Sankari - Tiruchengode - Paramathy road (Km 45+200 to Km 81+000 of SH86)	Thiruchengode - Paramathy Section	Meenkinar near Thiruchengode at Km 54+800 where proposed Thiruchengode bypass intersects SH 86	Paramathy at Km 81+000	26.2
4	Malliyakarai - Rasipuram - Tiruchengode - Erode Road (Km 0+000 to Km 94+660 of SH79)	Section I: Malliyakarai – Rasipuram Section	Malliyakarai at 0+000 where SH79 intersects SH30 (Km 81+000)	Near Namagiripettai at Km 30+600 where proposed Rasipuram bypass starts	30.6
		Section II: Rasipuram - Thiruchengode Section	Ponkurichi at Km 51+400 where proposed Rasipuram bypass ends	Mettupalayam at Km 71+280 where proposed Thiruchengode bypass starts	19.9
5	Mohanur – Namakkal – Senthamangalam - Rasipuram Road (Km 0+000 to Km 54+000 of SH95)	Mohanur – Namakkal Section	Mohanur town at RUB of Velur - Mohanur Road (MDR 547) at Km 15+650	Ladiwadi at Km 13+300 where proposed Namakkal Outer Ring Road intersects SH95	13.35

The present report on Environmental Impact Assessment (EIA) deals with the environmental analysis of Phase-I roads under TNRSP-II in accordance with World Bank’s guidelines on Environmental Assessment. **Figure 1.1** shows the location of project roads.

### 1.2.2. Objectives of the Assignment

Surface transport plays a vital role in the transportation of goods and agricultural products in this State. To achieve the Government’s development objectives, the existing road infrastructure urgently requires improvement. The main objective of the project would be to alleviate the current unsafe and congested conditions of the road network connecting the villages and towns by providing better quality and safe roads to the users in a sustainable and environment friendly manner.



**Figure 1.1. Location Map of Phase-I Roads under TNRSP-II PPC03**

This report is prepared in accordance with the World Bank's operational policies guidelines on Environmental Assessment and to meet the statutory requirement of Ministry of Environment, Forests and Climate Change (MoEF&CC). The major objectives of this study are stated below:

- To present to decision makers a clear assessment of potential impact associated with the proposed project intervention,
- To apply a methodology which assesses and predict potential impacts and provides a) the means for impact prevention and mitigation, b) the enhancement of project benefits, and c) the minimization of long-term impacts;
- To provide a specific forum in which consultation is systematically undertaken in a manner that allows stakeholders to have direct input to the environmental management process.
- To assess the analysis of alternatives to bring environmental considerations into the upstream stages of development planning as well as the later stage of site selection, design and implementation, and
- To recommend the environmental management measures to reduce adverse impacts.

In order to achieve these objectives, detailed surveys and other studies have been carried out along the project roads to identify Valued Environmental Components (VEC) and corridor specific significant environmental issues (SEI). For investigation/monitoring purpose the study area has been defined as,

- **Corridor of Impact (CoI):** is the proposed Right of Way (RoW).
- **Project Influence Area (PIA):** PIA is the 10 Km area on either side along the alignment. Topographical and Google Map showing Project Influence Area for TNRSP-II Phase-I roads is shown in **Annexure 1.1**.
- **Project District (PD):** is/are the district/districts through which project road is passing.

### **1.2.3. Scope of Environmental Assessment**

The environmental assessment scope includes screening and scoping, environmental assessment and environmental management plans for the individual project roads as required. The EA process also envisages to develop a comprehensive environmental management framework for the entire project, which will be adopted as part of the environmental policy for Tamil Nadu Road Sector Project-II.

#### **Environmental Screening and Scoping**

Environmental screening exercise of the project roads were undertaken to facilitate inputs on environmental considerations, apart from social, economic, and traffic & transport considerations to evaluate the adverse environmental impacts of each project corridor. Further, this report also provides scoping inputs in determining the major environmental issues and defines the scope of work for conducting environmental assessment. As per the recommendation of the Environmental Screening report, detailed Environmental Assessment has been carried out for the project roads. The scoping exercise defines geographical boundaries for the project roads for impact assessment as well as defining the project influence area to assess the impacts due to project activities.

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## **Environmental Assessment**

The EA for project roads includes establishing environmental baseline in the study area, conducting organized stakeholder consultation, identify the range of environmental impacts, specify the measures to avoid, minimize, and mitigate negative impacts and maximize positive impacts and integrate possible environmental enhancement measures. The proposed measures will be formulated in the form of an environmental management plan with necessary budget and institutional roles for effective implementation. Separate EMPs have to be prepared for individual project roads and integrated in to project implementation agreements, including construction contract documents.

## **Environmental Management Framework**

An Environmental Management Framework will be designed for the implementation of the project. The environmental management framework shall consists of overall framework which will be developed as a guidance document providing environmental planning and design criteria for of the current as well as future project roads, generic environmental management measures, institutional mechanism for implementation, capacity building and training process, and resource material to function adequately to mainstream the environmental management.

### **1.2.4. Project Benefits**

The main objective of the project is to provide safe and efficient service levels to growing traffic movements and better connectivity to the region. All road users will be benefited from the proposed improvement on account of comfort, safety and reduced vehicle operating costs. Development of the project road will help the local farmers and businessmen to trade their commodities to nearby cities/towns. Due to better infrastructure reputed educational institutes will look forward to establish in the project influence area, resulting in better education for the local inhabitants.

With the advent of better two lane highway, the vehicle operating and maintenance cost is expected to go down substantially. The proposed road alignment will also include general amenities like bus bays, landscaping and tree plantation, traffic aid post, emergency medical aid post, street light at built-ups etc. and thus overall facilities to the road users shall improve.

A significant economic benefit of the improvement project is generation of employment opportunities during the construction activities, which will be available to the people, including affected community. Besides, they will also draw benefits from the economic activities as a result of increased traffic flow and movement of vehicles. The project road will help in the economic upliftment of the entire region.

Namakkal district is emerging as new destination for dyeing industries, since the High Court of Tamil Nadu had issued closure order to dyeing industries located in Tirupur district two years ago, as they violated the pollution norms stipulated by CPCB. Improvement of selected corridors may attract more industries in the project region. Decadal growth rate of population in Namakkal district has increased from 12.90% in 1991-2001 to 15.61% in 2001-2011. The decadal population growth in 2001-2011 is higher compared to Tamil Nadu (15.60%) as well as neighboring districts i.e., Salem (15.43%) and Erode (11.66%). **Table 1.4** presents decadal population growth of Namakkal, Salem and Erode Districts and Tamil Nadu State.



**Table 1.3. Decadal Population Growth-rate**

Name	Population			Decadal Growth 1991- 2001 in %	Decadal Growth 2001 -2011 in %
	1991	2001	2011		
Tamil Nadu	5,58,58,946	62405679	72147030	11.72011552	15.60971879
Namakkal	13,22,715	1493462	1726601	12.90882768	15.61064158
Salem	25,73,667	3016346	3482056	17.20032156	15.43954175
Erode	18,02,900	2016582	2251744	11.85212713	11.66141521

Source: Census of India, 2011

The Net State Domestic Product (NSDP) and past Per Capita Income details for Tamil Nadu and neighboring influencing States (2007-12) are given in **Table 1.4** and **Table 1.5** respectively.

**Table 1.4. Growth in Net State Domestic Product**

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Growth
Tamil Nadu (Excluded Chennai)	2,72,33,984	2,86,74,358	3,16,75,986	3,59,96,050	3,86,76,820	4,02,60,286	8.1%
Karnataka	2,03,80,990	2,18,30,924	2,18,36,349	2,40,81,677	2,50,83,139	2,66,78,414	5.5%
Kerala	1,35,74,746	1,44,09,392	1,57,12,270	1,70,23,691	1,86,99,759	2,02,58,724	8.3%

Source: TNRSP. Unit- Rs. In crores, (Base: 2004-05)

**Table 1.5. Growth in Per Capita Income**

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Growth
Tamil Nadu (Excluded Chennai)	41,314	43,193	47,394	53,507	57,131	59,113	7.4%
Karnataka	35,574	37,687	37,294	40,699	41,959	44,183	4.4%
Kerala	40,288	42,433	45,921	49,391	53,877	57,938	7.5%

Source: TNRSP. Unit-Rs. (Base: 2004-05)

The above table shows that, Tamil Nadu is second highest in NSDP and PCI and it has got more potential in overall economic growth in south India.

## 1.2.5. Structure of the Report

The EIA is organized in accordance with the stipulation of the Environmental Impact Assessment Notification 2006, World Bank Operational Policy 4.01 and the recommendation from World Bank Technical Paper Number 376: *Roads and Environment: A Handbook*. Accordingly the entire document is organized in two parts.

**Environmental Impact Assessment (EIA)** for the TNRSP-II Phase-I roads acts as supporting document for the project. It identifies the impacts and proposes measures to minimize and mitigate them.

**Environmental Management Plan (EMP)** is prepared separately for each project road. It comprises (i) a Generic Environmental Management Action Plan (Generic EMAP) for generic mitigation measures which are not directly linked to the site and (ii) a Link Specific Environmental Management Action Plan for mitigation of those impacts, which are specific to the site / corridor.

The remaining part of this EIA document is organized according to the World Bank requirements as follows:

**Chapter-2: Project Description**, a brief description of the project corridors is given focusing on proposed improvements of corridors, right of way, roadway improvements, cross drainage structures, community facilities, traffic projections etc.

**Chapter-3: Environment Regulatory Framework** presents the legal and administrative framework of World Bank, Government of India and Government of Tamil Nadu. This section underlines various clearances involved for the project corridor at the State level and at the Central level.

**Chapter-4: Baseline Environmental Status** pronounces the existing environmental conditions along the corridor ascertained by a reconnaissance survey along with collection of secondary information pertaining to the corridor. Primary data for various environmental parameters was generated using suitable monitoring devices and methodology as stipulated by Central Pollution Control Board.

**Chapter-5: Public Consultation** was carried out in order to know the reactions of local population and the project affected people, PAP. Meetings were held with the stake holders to record their views on the impacts caused and the suggested remedies to be adopted for the proposed project corridor.

**Chapter-6: Analysis of Alternatives** was carried out during feasibility study, covered in Environmental Screening report, and the approved alternative is discussed in detail in this chapter.

**Chapter-7: Environmental Impacts**, likely impacts caused on various environmental and social parameters by activities proposed for the project corridor were recorded in this chapter.

**Chapter-8: Mitigation & Enhancement Measures**, various mitigation & enhancement measures were suggested for the impacts caused due to various activities.

**Chapter-9: References**

## Chapter 2. Description of the Project

### 2.1. General

Government of Tamil Nadu (GoTN), on behalf of TNRSP has decided to improve the roads of around 2,050 Km in the State of Tamil Nadu. Under Tamil Nadu Road Sector Project Phase-I (TNRSP-I), World Bank assisted Project, the GoTN has improved the State Highways for a length of about 1,800 Km under various improvement programs such as upgradation, enhanced periodical maintenance, performance based maintenance and Public Private Partnership in pilot basis were also taken up.

The GoTN has now mooted a second phase of works namely Tamil Nadu Road Sector Project-II (TNRSP-II). The TNRSP-II is expected to cover upgradation, maintenance and improvement of the identified core road network and the project is grouped into 5 packages namely PPC01, PPC02, PPC03, PPC04 and PPC05. The improvement mechanism consists of widening and strengthening of existing two lane carriageway to two lane with paved shoulder/ four lane or six lane depending upon the traffic assessment and pavement strengthening along with drainage facility, road furniture and accessories. In some cases new alignments and/or re-alignments may also be required.

Keeping in view the objective of such an exercise, TNRSP commissioned, M/s CDM Smith India Private Limited, Bangalore to undertake the study of road network under package PPC03 as an endeavour to dwell upon appropriate technologies and bring in sophistication in the approach to this Study. The task of study involves carrying out the Feasibility Studies, Environmental and Social Impact Assessment including preparation of Detailed Project Report for upgradation, maintenance and improvement. Corridors under package PPC03 as per the Contract Agreement are given in **Table 1.1** and the Location map is depicted in **Figure 1.1**.

### 2.2. Present Characteristics

#### 2.2.1. Right of Way (RoW)

Boundary stones for demarcating the ROW are available along the project road. The Available ROW along the project road varies from 20 – 25 m and at built up locations it is varying from 10- 18 m. **Table 2.1** gives the distribution of length and percentage length of Phase-I project roads with respect to ROW width.

**Table 2.1 Summary of Right of Way of Phase-I Roads under PPC03**

Name of the Road	Width of Existing ROW, m					Total Length
	<16	16 – 20	20 – 25	25 – 30	> 30	
Tiruchengode - Paramathy section of SH 86	0 Km	9 Km	11.2 Km	6 Km	0 Km	26.2 Km
	0%	34.4%	42.7%	22.9%	0%	100%
Malliyakarai - Tiruchengode section of SH 79	3 Km	17.6 Km	18.4 Km	11.0 Km	0.5 Km	50.6 Km
	5.9%	35%	36.4%	21.7%	1.0%	100%
Mohanur – Namakkal section of SH 95	0 Km	2.8 Km	1.6 Km	4 Km	5 Km	13.4 Km
	0%	20.90%	11.94%	29.85%	37.31%	100%

## 2.2.2. Traffic Scenario

The vehicle-wise average daily traffic (ADT) figures were estimated by classified count survey. The following table presents a summary of the vehicle-wise AADT (base year 2013) on the project road, for each homogenous section.

**Table 2.2. AADT along Homogeneous Segments of Phase-I Roads under TNRSP-II**

Name of the Corridor	Total Vehicles	AADT (PCUs)
Tiruchengode to Paramathy section of Road No. 2(SH 86)	5415	7152
Malliyakarai to Rasipuram section of Road No.4 (SH 79)	5918	7049
Rasipuram to Tiruchengode section of Road No.4 (SH 79)	7503	7334
Mohanur – Namakkal section of Road No.5 (SH 95)	5426	4920

## 2.2.3. Road Width

Existing carriageway of Tiruchengode to Paramathy section of Road No. 2 is of bituminous surface with two-lane configuration of approximately 7 m width. Entire project road is lined with earthen shoulder on either side of the carriageway and its width varies from 0.5m to 1.5m. Existing carriageway of Malliyakarai to Rasipuram and Rasipuram to Tiruchengode sections of Road No.4 is of bituminous surface with two-lane configuration with width ranging between 7 m and 7.2m. Entire project road is having earthen shoulder on either side of the carriageway and its width varies from 0.5m to 1.5m. Similarly, existing carriageway of Mohanur to Namakkal section of Road No. 5 is of bituminous surface with two-lane configuration where the width varies between 7 m and 7.2m. Entire project road has earthen shoulder on either side of the carriageway whose width varies from 0.5m to 2.5m.

## 2.2.4. Land Use and Roadside Environment

The project stretch routes predominantly through plain terrain and in parts through rolling terrain. The land use is agricultural with pockets of major & minor built-ups. Land use pattern for Tiruchengode to Paramathy Section of Road No. 2, includes agriculture (63.83%) and settlement (36.17%) and. For Road No. 4, Malliyakarai to Rasipuram the land cover includes mixed land use dominated by agriculture (71.97%), followed by settlements (23.97%), Forest areas (2.95%) and open area (1.31 %) and Rasipuram to Tiruchengode section consists of agriculture (82.41) and settlement (17.59). Mohanur to Namakkal section of Road No. 5 is dominated by settlement (52.60 %) followed by open land (28.57 %), agricultural land (16.88 %) and forest land (1.95 %).

## 2.2.5. Villages and Urban Builtup Sections

Major settlements along the project corridors are Namagiripettai, Rasipuram, Tiruchengode, Mohanur and Namakkal. In theses, Namagiripettai, Rasipuram, Tiruchengode and Namakkal are being bypassed under Rural Development Scheme, GoTN funded by NABARD. Hence, those towns were excluded from the scope of work. The important settlements along the project corridors are given in **Table 4.27**.

## 2.3. Proposed Improvements

Considering the importance of the project, careful planning has been made to provide various components of the highway. Improvements were proposed as per IRC guidelines and site specific

requirements that may affect the safety and operation of the highway. The proposed improvements are aimed at easing traffic congestion, reducing the road accidents by improving physical characteristics of the road, which includes geometry, pavement strength, drainage, road safety appurtenance and also enhancing the aesthetics. General philosophy followed in formulating the improvement proposals are;

- Improve the existing project facilities and introducing new facilities
- Strengthening/reconstruction/ new construction of the existing pavement;
- Improvement of geometric deficient curves;
- Provision of footpath cum built-up drains;
- Provision of utility corridors and cross ducts at junctions;
- Junction improvements;
- Widening/ reconstruction of existing Bridge and culverts and provision of additional culverts depending on the drainage condition;
- Provision for Pedestrian crossing facilities;
- Provision of traffic signs and road furniture;
- Improvement of road safety features;
- Provision of bus bays, Truck lay bays and passenger shelters.

### **2.3.1. Proposed Carriageway Configuration and Cross Sections**

#### **2.3.1.1. Tiruchengode to Paramathy Section of Road No. 2 (SH 86)**

The project road predominantly has a two-lane carriageway width ranging from 7 to 7.2 m and 0.5 to 1.5m earthen shoulder on both sides except from Km 65+100 to Km 66+000. It has Intermediate Divided Carriageway of 5.5 m width with median of 1.5 m at Kandampalayam built-up.

Based on traffic assessments, project corridor warrants two lane with paved shoulder.

##### **2.3.1.1.1. Cross Sectional Elements**

Uniform cross sectional elements for both two with paved shoulder and four lane are formulated by TNRSP and the parameters are given below. Uniform cross sectional elements for two lane with paved shoulder is formulated by TNRSP. Further to the discussions with the client, the typical parameters are modified as per site conditions and final cross section elements are given below.

##### **Urban Section – Two Lane with Paved Shoulders**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – Varies (end to end paved - up to available space);
- Water table/ Road gullies – 0.6 (0.3x2);
- Earthen shoulder – Nil;
- Foot path cum drain with utility duct - 4.0m(2X2m);
- Right of way – Minimum 16m.

##### **Village Section – Two Lane with Paved Shoulders**

- Main Carriageway – 7.0m (2x3.5m);

- Paved Shoulders – 2.5m (each on both sides);
- Water table/ Road gullies – 0.6 (0.3x2);
- Earthen shoulder – Nil;
- Open lined drain - 3.0m (2X1.5m);
- Utility corridor - 2.4m (2X1.2m);
- Right of way –16m.

#### **Rural Section – Two Lane and Paved Shoulders**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 1.5m (each on both sides);
- Water table/ Road gullies - Nil;
- Earthen Shoulders – 1.0m (each on both sides);
- Embankment slope – 1 in 3;
- Open earthen drains on both sides;
- Utility corridor - 2.0m (2X1.0m);
- Right of way – Minimum 23m.

Typical cross sections for different road sections were developed and is summarized as below -

- C2-U-R (F): Two Lane Carriageway with Paved Shoulder in Urban Area (Full depth Reconstruction)
- C2-U-O: Intermediate Divided Carriageway in with Paved Shoulder in Urban Area (Overlay)
- C2-V-O: Two Lane Carriageway with Paved Shoulder in Village Area (Overlay)
- C2-V-R (P): Two Lane Carriageway with Paved Shoulder in Village Area (Partial Depth Reconstruction)
- C2-V-R (F): Two Lane Carriageway with Paved Shoulder in Village Area (Full Depth Reconstruction)
- C2-R-O: Two Lane Carriageway with Paved Shoulder in Rural Area (Overlay)
- C2-R-R (P): Two Lane Carriageway with Paved Shoulder in Rural Area (Partial Depth Reconstruction)
- C2-R-R (F): Two Lane Carriageway with Paved Shoulder in Rural Area (Full Depth/New Reconstruction )

The chainage wise details of typical cross section are given in **Annexure 2.1**. Drawing of typical cross sections types is presented as **Annexure 2.2**.

#### **2.3.1.2. Malliyakarai to Rasipuram and Rasipuram to Tiruchengode Sections of Road No. 4 (SH 79)**

The project road of both the sections predominantly has a two-lane carriageway width ranging from 7 to 7.2 m and 0.5 to 1.5 m earthen shoulder on both sides of the project road. At built-ups of Rasipuram & Thiruchengode Carriageway widths vary from 10 to 12m.

Based on traffic assessments explained in data report, project corridor warrants two lane with paved shoulder for section I and II.

#### **2.3.1.2.1. Cross Sectional Elements**

Uniform cross sectional elements for two lane with paved shoulder is formulated by TNRSP. Further to the discussions with the client, the typical parameters are modified as per site conditions and final cross section elements are given below

#### **Urban Section – Two Lane with Paved Shoulders (Section I and II)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 5m (2 x 2.5m);
- Water table/ Road gullies – 0.6 (0.3x2- Included paved shoulder);
- Earthen shoulder – Nil;
- Foot path cum drain with utility duct - 4.0m (2x2m);
- Right of way – Minimum 16m.

#### **Urban Section – Intermediate lane (Section II at Vaiyappamali Village)**

- Median – 0.5 (0.25x2), Shyness – 0.5 (0.25x2)
- Main Carriageway – 11.0m (2x5.5m);
- Foot path cum drain with utility duct - 4.0m (2X2m);
- Right of way – Minimum 16m.

#### **Village Section – Two Lane with Paved Shoulders (Section I and II)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 5m (2 x 2.5m);
- Water table/ Road gullies – 0.6 (0.3x2- Included paved shoulder);
- Earthen shoulder – Nil;
- Covered lined drain -2.0m (2x1m);
- Utility corridor - 2m (2x1m);
- Right of way – Minimum 16m.

#### **Rural Section – Two Lane and Paved Shoulders (Section I and II)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 3m (2x1.5m);
- Water table/ Road gullies - Nil;
- Open earthen drains on both sides;
- Embankment slope – 1 in 3;
- Open earthen drains on both sides;
- Utility corridor - 2.0m (2x1.0m);
- Right of way – Minimum 23m.

Typical cross sections for different road sections were developed and are summarized as below.

- C4-U - O Two Lane Carriageway with Paved Shoulder in Urban Area (Overlay)
- C4-U – P Two Lane Carriageway with Paved Shoulder in Urban Area (Partial Reconstruction)
- C4-U – N Two Lane Carriageway with Paved Shoulder in Urban Area (New Construction)
- C4-V – O Two Lane Carriageway with Paved Shoulder in Village Area (Overlay)
- C4-V – P Two Lane Carriageway with Paved Shoulder In Village Area (Partial Reconstruction)
- C4-V – N Two Lane Carriageway with Paved Shoulder in Village Area (New Construction)
- C4-R – O Two Lane Carriageway with Paved Shoulder in Rural Area (Overlay)
- C4-R – P Two Lane Carriageway with Paved Shoulder in Rural Area (Partial Reconstruction)
- C4-R – N Two Lane Carriageway with Paved Shoulder in Rural Area (New Construction)
- C4-F – O Two Lane Carriageway with Paved Shoulder in Forest section - RHS (Overlay)
- C4-F – O Two Lane Carriageway with Paved Shoulder in Forest Area – LHS (Overlay)
- C4-U – P Intermediate carriageway in Vaiyappanmalai Location (Partial depth reconstruction)

The chainage wise details of typical cross section are given in **Annexure 2.1**. Drawing of typical cross sections types is presented as **Annexure 2.2**.

### **2.3.1.3. Mohanur to Namakkal Section of Road No. 5 (SH 95)**

The project road of both the sections predominantly has a two-lane carriageway width ranging from 6 to 7.2 m and 0.5 to 1.5m earthen shoulder on both sides of the project road. At built-up of Mohanur Carriageway widths vary from 7 to 9m.

Based on traffic assessments explained in Chapter 3 of Main Report Volume, project corridor warrants two lane with paved shoulder for section I.

#### **2.3.1.3.1. Cross Sectional Elements**

Uniform cross sectional elements for two lane with paved shoulder is formulated by TNRSP. Further to the discussions with the client, the typical parameters are modified as per site conditions and final cross section elements are given below

#### **Urban Section – Four Lane with Paved Shoulders (from Ch.0+600 to Ch.2+100)**

- Main Carriageway – 14.0m (2x7m);
- Paved Shoulders – Varies (end to end paved - up to available space);
- Water table/ Road gullies – 0.6 (0.3x2 -Included in paved shoulder edges)
- Earthen shoulder – Nil;



- Foot path cum drain with utility duct - 4.0m(2x2m);
- Right of way – Minimum 20m.

**Urban Section – Two Lane with Paved Shoulders (from Ch.0+000 to Ch.0+600)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 5m (2 x 2.5m);
- Water table/ Road gullies – 0.6 (0.3x2- Included in paved shoulder edges);
- Earthen shoulder – Nil;
- Foot path cum drain with utility duct - 4.0m(2x2m);
- Right of way – Minimum 16m.

**Village Section – Two Lane with Paved Shoulders (Section I)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 5m (2 x 2.5m);
- Water table/ Road gullies – 0.6 (0.3x2 -Included in paved shoulder edges)
- Earthen shoulder – Nil;
- Covered lined drain -2.0m (2x1m);
- Utility corridor - 2m (2x1m);
- Right of way –16m.

**Rural Section – Two Lane and Paved Shoulders (Section I)**

- Main Carriageway – 7.0m (2x3.5m);
- Paved Shoulders – 3m (2x1.5m);
- Water table/ Road gullies - Nil;
- Earthen Shoulders – 2.0m (2 x 1m);
- Open earthen drains on both sides;
- Utility corridor - 2.0m (2x1.0m);
- Right of way – Minimum 23m.

Typical cross sections for different road sections were developed and is summarized as below.

- C5 –U-P- Four Lane Divided Carriageway with Paved Shoulder/Available Space in Urban Area from Ch.0+600 to 2+100 with ROW varying from 20m To 30m
- C5 –U-P- Two Lane Carriageway with Paved Shoulder/Available Space in Urban Area from Ch. 0+000 to 0+600 with ROW varying from 16m To 20m
- C5 –V-P- Two Lane Carriageway with Paved Shoulder in Village Area
- C5 –R-P- Two Lane Carriageway with Paved Shoulder in Rural Area
- C5 – R-N- Two Lane Carriageway with Paved Shoulder in Realignment Area
- C5 –R-P- Two Lane Carriageway Paved Shoulder in Forest Area
- C5 –R-O- Existing Two Lane ROB Approach

The chainage wise details of typical cross section are given in **Annexure 2.1**. Drawing of typical cross sections types is presented as **Annexure 2.2**.

## 2.3.2. Identification of Realignment and Bypass Provisions

There are no bypasses proposed to any of the TNRSP-II Phase-I Roads. Minor realignments are proposed at deficient geometric locations. Locations of realignments are given in the **Table 2.1**. Detailed discussion on identification of realignment provision is presented in **Chapter 6. Analysis of Alternatives**.

**Table 2.1. List of Realignment Locations of Phase-I Roads under PPC03**

Sl. No.	Chainage		Length (m)
	From (Km)	To (Km)	
<b>Tiruchengode to Paramathy section of Road No. 2(SH 86)</b>			
1	55+600	55+750	150.0
<b>Malliyakarai to Rasipuram section of Road No.4 (SH 79)</b>			
1	0+320	0+500	180
2	2+900	3+130	230
3	8+260	8+580	390
4	20+600	20+800	200
5	29+600	29+930	330
<b>Rasipuram to Tiruchengode section of Road No.4 (SH 79)</b>			
1	59+900	60+300	400
2	61+450	62+000	550
<b>Mohanur – Namakkal section of Road No.5 (SH 95)</b>			
1	2+030	2+480	450
2	6+680	6+930	350

## 2.4. Culvert and Bridges

The Bridge and culvert inventory was carried out to assess the existing condition and the hydrological adequacy. The detailed information on all the structural components, HFL, LWL dimensions of all the components, linear water way, vertical clearances, drainage spouts, handrails etc. are recorded.

### 2.4.1. Tiruchengode to Paramathy Section of Road No. 2(SH 86)

There are 28 culverts and 1 bridge on the project stretch. New balancing cross drainage structures have been proposed along the existing road based on terrain, vertical geometry etc. following IRC SP 13 guidelines. A summary of improvement proposals for cross-drainage structures are given in **Table 2.2** and

**Table 2.3.**

**Table 2.2. Summary of Proposal for Culverts for Thiruchengode – Paramathy Road**

Description	Type of culverts, Nos.			Total Nos.
	HP	Box	Slab	
Retained with minor repairs / widening	22	-	1	23
Reconstruction on Realignment	-	-	-	-
Reconstruction due to poor /dilapidated condition/ inadequate waterway	-	5	-	5
Additional Culverts	-	4	-	4

<b>Total Numbers</b>	<b>32</b>
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**Table 2.3. Details of Existing Bridges and Proposal for Thiruchengode – Paramathy Road**

Location (Ex Km)	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)
70+210	2x6.8	Retained	--

#### 2.4.1.1. Malliyakarai to Rasipuram Section (Section I) of Road No. 4 (SH 79)

There are 42 culverts and 7 bridges on the project road. New balancing cross drainage structures have been proposed along the existing road based on terrain, vertical geometry etc. following IRC SP 13 guidelines. A summary of improvement proposals for cross-drainage structures are given in **Table 2.4** and **Table 2.5**.

**Table 2.4. Summary of Proposals for Culverts for Malliyakarai - Rasipuram Road**

Description	Type of culverts, Nos.			Total Nos.
	HP	Box	Slab	
Retained with minor repairs / widening	24	-	8	32
Reconstruction on Realignment	-	-	-	-
Reconstruction due to poor /dilapidated condition/ inadequate waterway	3	7	-	10
Additional Culverts	-	3	-	3
<b>Total Numbers</b>	<b>45</b>			

**Table 2.5. Details of Existing Bridges and Proposal for Malliyakarai - Rasipuram Road**

Sl. No	Location (Ex Km)	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)
1	4+338	2 x 3.6	Widening	--
2	12+449	30 x 0.75m dia	Reconstruction	3 x 8 x 2
3	14+206	3 x 4	Retained	--
4	14+583	3 x 8.42	Widening	--
5	18+250	2 x 4.5	Widening	--
6	24+505	1 x 21.0	Widening	--
7	28+430	2 x 5.7	Widening	--

#### 2.4.1.2. Rasipuram to Tiruchengode (Section II) Section of Road No. 4 (SH 79)

There are 16 culverts and 1 bridge on the project road. New balancing cross drainage structures will be proposed along the existing road based on terrain, vertical geometry etc. following IRC SP 13 guidelines. A summary of improvement proposals for cross-drainage structures are given in **Table 2.6** and **Table 2.7**.

**Table 2.6. Summary of Proposals for Culverts for Rasipuram - Tiruchengode Road**

Description	Type of culverts, Nos.			Total Nos.
	HP	Box	Slab	
Retained with minor repairs / widening	10	-	2	12
Reconstruction on Realignment	-	-	-	-
Reconstruction due to poor /dilapidated	2	2	-	4

condition/ inadequate waterway				
Additional Culverts	-	3	-	3
<b>Total Numbers</b>	<b>19</b>			

**Table 2.7. Details of Existing Bridges and Proposal for Rasipuram - Tiruchengode Road**

Sl. No	Location (Ex Km)	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)
1	61+955	15 x 4.4	New construction on Realignment	6 x 10.5 x 4.5

The formation width of new bridges and culverts has been considered as follows:

- Culverts-12.0 m
- Bridge with footpath- 14.8 m
- Bridge without footpath- 12.9 m

#### 2.4.1.3. Mohanur to Namakkal Section of Road No. 5 (SH 95)

There are 19 culverts, 1 bridge and 1 ROB on the project stretch. New balancing cross drainage structures have been proposed along the existing road based on terrain, vertical geometry etc. following IRC SP 13 guidelines. A summary of improvement proposals for cross-drainage structures are given in **Table 2.8**, **Table 2.9** and **Table 2.10**.

**Table 2.8. Summary of Proposals for Culverts for Mohanur – Namakkal Road**

Description	Type of culverts, Nos.			Total Nos.
	HP	Box	Slab	
Retained with minor repairs / widening	11	-	3	14
Reconstruction on Realignment	-	-	-	-
Reconstruction due to poor /dilapidated condition/ inadequate waterway	-	5	-	5
Additional Culverts	-	-	-	-
<b>Total Numbers</b>	<b>19</b>			

**Table 2.9. Details of Existing Bridges and Proposal for Mohanur – Namakkal Road**

Sl. No	Location (Ex Km)	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)
1	2+282	9x1.7	New construction on Realignment	3 x 5.5 x 3

**Table 2.10. Details of Existing ROB and Proposal for Mohanur – Namakkal Road**

Sl. No	Location (Ex Km)	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)
1	3+627	8x20.4m+19.9m+7.8m+33.2m+19.8m+7x20.4m	Retained	--

## 2.5. Identification of Borrow Areas

Extensive survey was conducted to identify borrow areas for locating suitable soil/soil aggregates mixes to be used in the construction of embankment and sub-grade. Efforts were made to locate borrow areas near the project road to avoid long haulage of the materials. Similarly, detailed survey

was carried out to identify stone metal quarries of hard stone for use in Granular Sub-base (GSB), Wet Mix Macadam (WMM), bituminous and cement concrete works.

The following conclusions have been made based on the exploration of potential borrow sources:

- Construction materials are available with in an economical lead;
- Construction materials can be obtained/exploited without any hassles during the implementation of the project;
- The soil/crushed stone aggregates/ sand etc are exhibiting higher strength properties than recommended.
- To procure good quality crushed stone aggregate in large quantity, the contractor is required to install his own crushing plant thus enhancing the quality of the materials;

## **2.6. Geotechnical Investigation**

Geotechnical investigations are carried out at proposed bridge locations to explore subsurface conditions by drilling boreholes to different depths in order to identify the thickness and sequences of various strata and to ascertain the sub surface profile of soils and bed rock to determine the most suitable foundation levels of structures.

## **2.7. Hydraulic and Hydrological Investigations**

All the hydraulic data for bridges has been collected from the field and it has been analyzed and studies carried out to determine the waterway of the new bridges to be constructed as per provisions of **IRC: 5-1998** and **IRC: SP-13**. 50 year return flood was considered.

## **2.8. Road Safety Review**

Traffic safety, control devices and appurtenances are missing or ill maintained. Visibility of the existing marking or signboard is also another cause of concern. Dedicated signs for pedestrian crossing is also absent except at some locations. Place identification, cautionary, warning and mandatory signs are also missing at important location like curves, intersections, schools and built-ups.

Traffic signs, road markings, and lighting are important features of traffic safety and control devices; they transmit visually vital information to drivers, and ensure increased safety and efficiency in free flow of traffic. The standard road markings and traffic signs give information about highway routes, directions, and destinations. These also give information on special obligations, prohibitions, and restrictions and caution about the existence of any hazardous conditions on or adjacent to the roadway. IRC standards were adopted for both markings and signs.

### **2.8.1. Road Marking**

The specification and standards for road markings are as per IRC: 35 1997. Lane markings are provided both with Thermoplastic paint mixed with retro-reflective beads throughout and with Raised Pavement Markers (Cat's eye) on curves. The lane marking are provided at 3.5 m lane width and

edges of paved shoulders are proposed. The cat's eyes at curves are provided at 9 m intervals placed at the center of the line marking spacing for improve visibility and drivability during night drive.

Edge markings are provided at the carriageway edges. The markings are continuous strip of painting with breaks at the junctions. Other markings, viz, island marking, warning lines, chevron markings and directional arrows, etc. are provided at suitable locations.

## 2.8.2. Traffic Signs

Various traffic signs, viz, regulatory, cautionary and information signs are provided in the project road at curves, intersections, median openings and at all necessary places. The specifications and standards for traffic signs are as per IRC: 67-2012. List of road signs are given in **Table 2.11**. **Table 2.12** gives the summary of the number of proposed road signs.

**Table 2.11. List of Road Signs**

Typical Signs	List of Signs
Mandatory / Regulatory Signs	Stop Sign
	No parking Signs at locations of 2.5m paved shoulder
Cautionary / Warning Signs	Curve Sign
	Object Marker
	Side Road
	Chevron Signs for curves
	Red reflectors
	Keep left
	Cat's eyes
Information Sign	Advanced Direction Sign
	Route Marker Sign
	Place Identification Sign
	Overhead Cantilever Sign Boards
	Cluster of Reflectors
	Overhead Gantry Sign Boards
	Bus Stop

**Table 2.12. Summary of Road Furniture**

Sl. No	Type of Furniture	Thiruchengode – Paramathy Road (SH 86)	Malliyakarai – Rasipuram Road (SH 79)	Rasipuram – Thiruchengode Road (SH 79)	Mohanur – Namakkal Road (SH 95)
1	60 cm equilateral triangle (Nos.)	34	77	20	46
2	75 cm equilateral triangle (Nos.)	22	27	16	4
3	90 cm equilateral triangle (Nos.)	21	4	6	6
4	80 cm x 60 cm rectangular (Nos.)	30	25	20	-
5	60 cm x 45 cm rectangular (Nos.)	-	-	-	-
6	Circular Signs, 600mm (Nos.)	13	27	16	15
7	Circular Signs, 900mm (Nos.)	65	70	32	35

Sl. No	Type of Furniture	Thiruchengode – Paramathy Road (SH 86)	Malliyakarai – Rasipuram Road (SH 79)	Rasipuram – Thiruchengode Road (SH 79)	Mohanur – Namakkal Road (SH 95)
8	90 cm high octagon (Nos.)	50	55	45	57
8	Direction and Place identification (Nos.)	75	100	60	4120
9	Lane, Centerline, Edge and other marking along strips (m <sup>2</sup> )	12150	13790	8946	1350
10	Directional arrows ,Pedestrian Crossings and letters (m <sup>2</sup> )	4850	4050	3100	60
11	Delineators (road way indicators, hazard markers, object markers) (Nos.)	130	200	50	750
12	"W" metal beam crash barrier (m)	-	5 No's	2 No's	2
13	Cantilever Overhead Sign (Nos.)	2 No's	15000	12000	6266
14	Road studs 100x 100 mm (Nos.)	14500	760	160	-
15	Retro-reflectorised sheet of 250 mm x 100 mm - median, copings and crash barriers, railings etc (m <sup>2</sup> )	-	55No's	45No's	30
16	LED blinkers (Nos.)	50 No's	2No's	1No's	2
17	Gantry signs (Nos.)	6 No's	3	2	1
18	High Mast Lighting (Nos.)	2	9000	2400	2700
19	Pedestrian Guard Rail (m)	3500	13	5	30
20	Table Top Pedestrian Crossing	25	40No's	28No's	2
21	Bull Nose	-	50 No's	45 No's	25
22	Facility	47	77	20	42
23	Transverse Bars (All Minor Junctions)	46 No's	27	16	46

### 2.8.3. Pedestrian Hand Rails

Pedestrian hand rails are proposed at following locations;

- At all major junctions
- Schools and hospitals
- Bus bay locations

## 2.8.4. Project Facilities

Adequate provisions of wayside amenities are provided on the project road to improve the safety for the convenience of road users and aesthetics of the surrounding environment.

**Litter Bins:** Litter bins are provided at all bus bays and passenger shelter locations for temporarily storing the refuse and waste. Also two bins each are provided at all major junctions of the project corridor.

## 2.8.5. Bus Bays with Passenger's Shelters

Bus bays with passenger shelters are provided with adequate paving of lay bye area, drainage and road markings confirming to IRC\_80:1998, where adequate space is available considering the safety and future traffic. Additional facilities like Pedestrian crossings, signboards, etc. are also provided at these locations for enhanced safety. Details of bus bay location are presented in **Table 2.13**. A typical layout is shown **Figure 2.1** and **Figure 2.2**.

**Table 2.13. List of Bus Bay with Passenger's Shelter**

Sl. No.	Des. Chainage (Km)	Side	Sl. No.	Des.Chainage (Km)	Side
<b>Tiruchengode to Paramathy Section of Road No.2 (SH 86)</b>					
1	57+450	LHS	18	67+500	RHS
2	57+240	RHS	19	67+820	LHS
3	58+140	LHS	20	68+000	RHS
4	58+280	RHS	21	69+430	LHS
5	59+720	RHS	22	69+550	RHS
6	59+870	LHS	23	70+340	RHS
7	60+570	RHS	24	70+500	LHS
8	60+780	LHS	25	71+620	RHS
9	63+630	LHS	26	71+870	LHS
10	63+750	RHS	27	73+090	LHS
11	64+180	RHS	28	73+220	RHS
12	64+360	LHS	29	74+200	LHS
13	65+680	LHS	30	74+460	RHS
14	65+470	RHS	31	76+250	RHS
15	66+270	RHS	32	76+570	LHS
16	66+400	LHS	33	79+040	RHS
17	67+380	LHS	34	79+160	LHS
<b>Malliyakarai to Rasipuram Section (Sec I) of Road No.4 (SH 79)</b>					
1	0+308	LHS	19	16+030	RHS
2	2+550	LHS	20	16+450	LHS
3	2+655	RHS	21	17+850	RHS
4	4+050	LHS	22	18+000	LHS
5	4+850	RHS	23	20+300	LHS
6	6+200	LHS	24	20+300	RHS
7	6+600	RHS	25	21+500	RHS
8	7+700	LHS	26	21+760	LHS
9	7+900	RHS	27	23+000	RHS
10	9+500	LHS	28	23+050	LHS
11	9+700	RHS	29	24+200	LHS



Sl. No.	Des. Chainage (Km)	Side		Sl. No.	Des.Chainage (Km)	Side
12	10+300	LHS		30	24+200	RHS
13	10+500	RHS		31	26+500	RHS
14	11+850	LHS		32	26+650	LHS
15	12+600	RHS		33	28+600	LHS
16	13+400	LHS		34	28+700	RHS
17	13+800	RHS		35	29+050	RHS
18	14+350	LHS		36	29+350	LHS
<b>Rasipuram to Tiruchengode Section (Sec II) of Road No. 4 (SH 79)</b>						
1	51+750	LHS		15	61+300	RHS
2	51+800	RHS		16	61+400	LHS
3	53+850	RHS		17	62+250	RHS
4	53+900	LHS		18	62+350	LHS
5	54+600	LHS		19	63+700	LHS
6	54+630	RHS		20	63+800	RHS
7	55+500	LHS		21	66+350	RHS
8	55+550	RHS		22	66+400	LHS
9	57+650	RHS		23	67+200	LHS
10	57+700	LHS		24	67+350	RHS
11	58+450	LHS		25	69+600	LHS
12	58+650	RHS		26	69+640	RHS
13	60+200	RHS		27	70+500	RHS
14	60+350	LHS		28	70+550	LHS
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>						
1	1+210	LHS		12	8+150	RHS
2	1+340	RHS		13	9+100	RHS
3	1+900	LHS		14	9+100	LHS
4	1+900	RHS		15	10+010	RHS
5	1+790	RHS		16	10+110	LHS
6	2+990	LHS		17	11+620	LHS
7	5+020	RHS		18	11+620	RHS
8	5+050	LHS		19	12+160	RHS
9	6+260	LHS		20	12+300	LHS
10	6+480	RHS		21	12+700	LHS
11	8+150	LHS		22	12+800	RHS

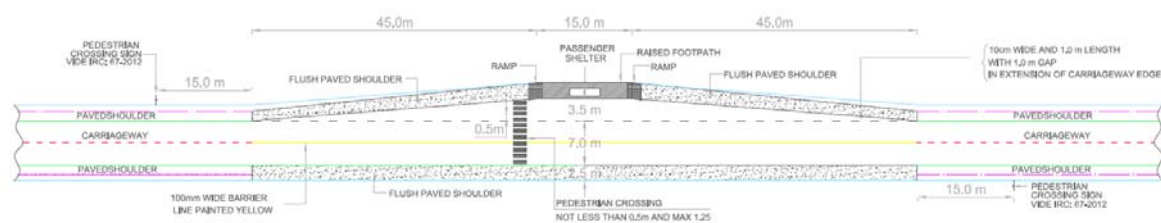


Figure 2.1. Typical Layout of a Bus Bay (3.5m wide)

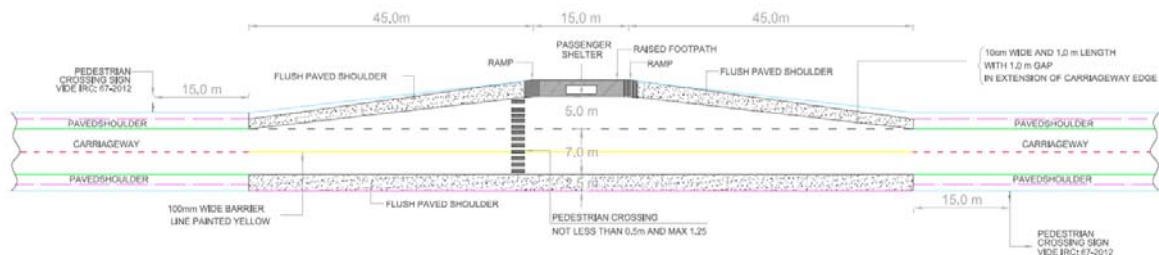


Figure 2.2. Typical Layout of a Bus Bay (5.0m wide)

## 2.8.6. Pedestrian Crossings

Adequate pedestrian crossing facilities conforming to IRC\_103:2012 are provided at all important intersections and such other locations where substantial conflict exists between vehicular and pedestrian movements.

### 2.8.6.1. Crossings at Intersections

Controlled form of at-grade pedestrian crossings with zebra lines and road studs are provided at all major intersections with ample lighting to facilitate night vision at crossings. A separate signal phase is provided for pedestrian crossings at signalized junctions.

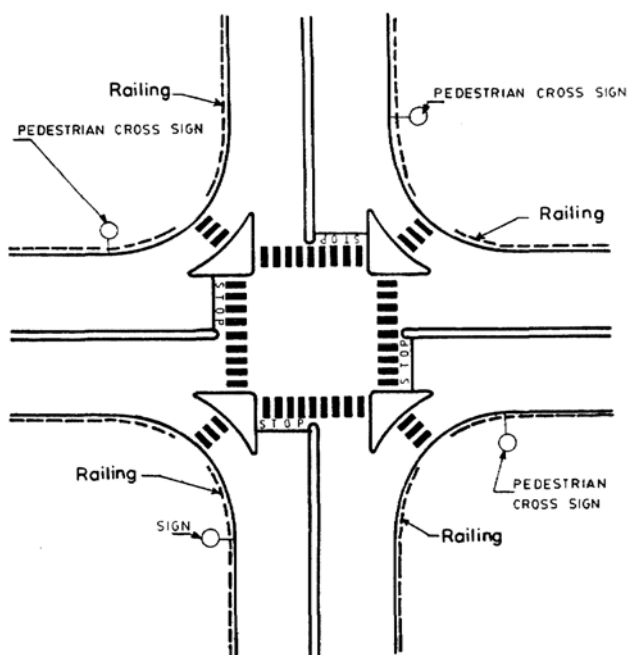


Figure 2.3. Type Design of Four Arm Channelised Intersection Showing Arrangement of Zebra Crossing

### 2.8.6.2. Mid Block Zebra Crossings

With reference to IRC\_103:2012, mid-block zebra crossings are provided where distance between two consecutive intersections is more than 300 m and simultaneously, there is a genuine demand for such facility i.e. at important crossing locations like schools, hospitals and bus stop locations.

At such important crossing locations, provision is given for additional safety measures like raised footpath and railings along with zebra crossings and road studs with markings and cautionary signs.

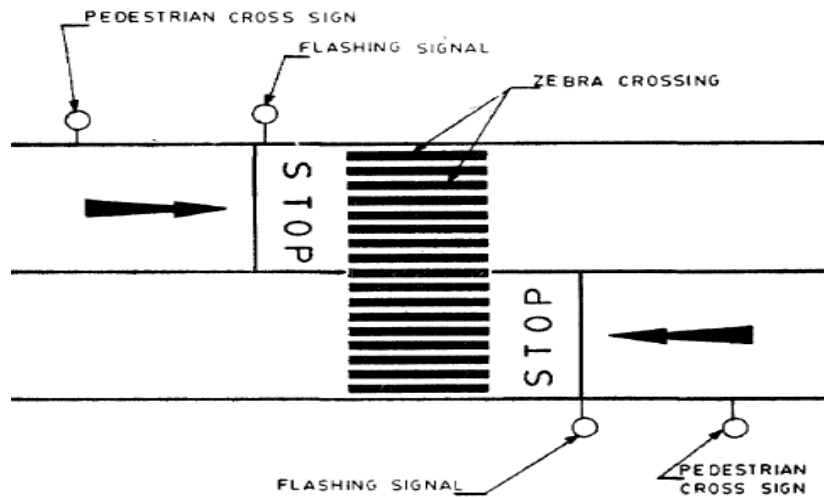


Figure 2.4. Mid Block Zebra Crossing across Two-way Street



Figure 2.5. Table Top Pedestrian Crossing

## 2.9. Road Construction Standards, Norms and Guidelines

Codes of Practice of Indian Road Congress (IRC), particular to environmental issues, which are relevant to the proposed project, are presented as **Annexure 2.3**. These guidelines should be followed by the implementing agency during road construction

# **Chapter 3. Environmental Regulatory Framework**

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## **3.1. Applicable Regulations**

The chapter presents a review of the existing institutions and legislations relevant to the project at the National and State level. The various statutory clearances from various state and central government authorities and the institutional and legal frameworks are discussed in the following sections.

### **3.1.1. Legal Framework**

The Government of India has laid out various policy guidelines, acts and regulations pertaining to environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Ministry of Environment, Forests and Climate Change (MoEF&CC) and Central Pollution Control Board (CPCB) / Tamil Nadu Pollution Control Board (TNPCB) in the present context. More details on the legal framework of Government of India and State Government regulations and clearance procedures are envisaged in the following Sections.

### **3.1.2. Key Environmental Laws and Regulations of GoI**

The Indian constitution makes environmental protection an explicit duty for every citizen by the statement, “It shall be duty of every citizen of India to protect and improve the environment including forests, lakes, rivers, wild life, and to have compassion for living creatures”. In addition, GoI has laid out various policy guidelines, acts and regulations pertaining to sustenance of environment and these have been presented in the following sections.

#### **3.1.2.1. Environment (Protection) Act, 1986**

The Environmental (Protection) Act, 1986 is the umbrella legislation providing for the protection of environment in the country. This Act provided for the Environment (Protection) Rules, which were formulated in 1986, the Environmental Impact Assessment Notification, 1994 and the Amendments thereto (up to July 2004), and various other notifications.

#### **3.1.2.2. EIA Notification, 2006**

The EIA notification dated 14<sup>th</sup> September, 2006 imposes certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the schedule to the notification, being undertaken in any part of India, unless prior environmental clearance has been accorded by the Ministry of Environment, Forests and Climate Change (MoEF&CC) or the State or Union territory Level Environment Impact Assessment Authority (SEIAA).

Item No 7(f) of the EIA notification, 2006 specifies that Expansion of National Highways greater than 100 Km involving additional right of way or land acquisition greater than 40 m on existing alignments and 60 m on re-alignments or bypasses is categorized as “A” project and requires prior environmental clearance from

MoEF&CC. Whereas, all new State Highway projects; and expansion of State Highways in hilly terrain (above 1,000 m above mean sea level) and or ecologically sensitive areas falls in Category 'B' project and requires prior environmental clearance from SEIAA.

The proposed Phase-I roads under TNRSP-II are not attracting the provisions of EIA Notification, 2006 since they are not National Highways or new State Highways. Even though this project involves expansion of existing State Highways, they are not falling in hilly terrain above 1000 m above mean sea level or eco sensitive areas. Hence, the project roads do not require environmental clearance from SEIAA or MoEF&CC.

### **3.1.2.3. The Water (Prevention & Control of Pollution) Act, 1974**

This act provided for the prevention and control of water pollution and the maintaining and restoring of the wholesomeness of water. The Act resulted in the establishment of the Central and State level Pollution Control Boards whose responsibilities include managing water quality and effluent standards, as well as monitoring water quality, prosecuting offenders and issuing licenses for construction and operation of certain facilities.

The Contractor has to obtain consent to establish for construction camps from the Tamil Nadu Pollution Control Board as per the Water (Prevention and Control of Pollution) Act of 1974, since it involves discharge of waste water from construction camps.

### **3.1.2.4. The Air (Prevention & Control of Pollution) Act, 1981**

This act provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant' which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The SPCB is empowered to implement air quality standards and monitor and prosecute offenders under The Air (Prevention and Control of Pollution) Act, 1981. The Contractor has to obtain consent to establish and consent to operate for construction camps from the Tamil Nadu Pollution Control Board as per the Air (Prevention and Control of Pollution) Act of 1981, since it involves operation of Hot Mix Plants and Diesel Generator Sets.

### **3.1.2.5. Noise Pollution (Regulation and Control) Rules, 2000**

The ambient air quality standards in respect of noise for different areas/zones are specified in the Schedule of these rules. The State Government may categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas. As per these rules, an area comprising not less than 100 meters around hospitals, educational institutions and courts may be declared as silence area/zone.

The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule. The State Pollution Control Board is responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise. The proposed project in its construction and operation phases may attract the provisions of these rules if the noise level from the construction machinery and the vehicles are above the standards.

### **3.1.2.6. Fly Ash Notification, 2007**

The notification specifies the responsibility of highway agencies for use of fly ash for road construction, if any thermal power plant is located within 100 Km from it. Since, Mettur Thermal Power Plant is located within 100 Km from the proposed project corridors, provisions of the said notification is applicable for the project.

### **3.1.2.7. The Explosives Act (& Rules), 1884 (revised in 1983)**

This Act specifies regulations regarding the use of explosives and precautionary measures while blasting and quarrying. Provisions of these rules are applicable to this project.

### **3.1.2.8. The Municipal Solid Waste (Management & Handling) Rules, 2000**

The Municipal Solid Waste (management & Handling) Rules, 2000 (MSW Rules) establish consistent regulation governing collection, segregation, transportation, and disposal of types of municipal solid wastes throughout India. The MSW Rules seeks to minimize the burden of on landfills for the disposal of municipal waste by adopting appropriate waste segregation and treatment technologies. Establishing construction camp during construction phase may attract the provisions of this rule.

### **3.1.2.9. The Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008**

The Hazardous Wastes (Management, Handling and Trans boundary movement) Rules, 2008 and its subsequent amendment were created to provide ‘cradle-to grave’ or comprehensive guidance to the generators, transporters and operators of disposal facilities among others, and monitoring norms for State governments. As per the provisions of Rules, every occupier handling, or recycler recycling, hazardous wastes including facility for collection, reception, treatment, transport, storage and disposal of such wastes is required to obtain authorization from concerned State Pollution Control Board (SPCB) / Pollution Control Committee (PCC) in UT for any of the said activities.

### **3.1.2.10. The E-Waste (Management and Handling) Rules, 2011**

These rules shall apply to every producer, consumer or bulk consumer involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components as specified in Schedule I (of E-Waste (Management and Handling) Rules, 2011), collection centre, dismantler and recycler of e-waste. The project is likely to generate e-waste from the equipment and machineries used construction activity. Hence the said rule is applicable for the subject project.

Workers engaged in dismantling and handling e-waste are to be issued with proper personal protective equipment (gloves, dust mask etc.) The recoverable items are to be sold only to authorized recyclers.

### **3.1.2.11. Batteries (Management and Handling) Rules, 2001**

These rules shall apply to every manufacturer, importer, re-conditioner, assembler, dealer, recycler, auctioneer, consumer and bulk consumer involved in manufacture, processing, sale, purchase and use of batteries or components thereof. Establishing construction camp may attract these kind of activities and applicable for the subject project.

### **3.1.2.12. Policies of Ministry of Environment, Forests and Climate Change, Government of India**

#### **National Environmental Policy, 2006**

This policy intends to mainstream environmental concerns in all developmental activities. The policy stresses on conservation of critical environmental resources, intra-generational and inter-generational equity, efficiency in environmental resource use and adoption of a pre-cautionary approach

#### **Ground Water Recharge**

Groundwater recharging structures should be constructed along the road for ground water recharge. MoEF&CC insists this while issuing environmental clearance for road projects.

### **3.1.3. Environmental Requirements of the State**

#### **3.1.3.1. Tamil Nadu Forest Act 1882 and Tamil Nadu Timber Transit Rules**

No person shall move timber notified as Schedule Timber under the Tamil Nadu Forest Act, 1882 into or from or within the State by land, water or air unless such timber is accompanied by a permit issued by the Tamil Nadu Forest Department. Black wood, Red Sanders, Rosewood, Sandalwood and Teakwood are trees notified as Schedule Timber under Tamil Nadu Forest Act, 1882. Since the project envisages cutting of non-schedule trees for widening of existing at-grade road, requires permit from respective District Collectors and forest department for cutting of trees and their transportation.

### **3.1.4. Other Legislation Applicable to Road Construction**

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

- **Workmen's Compensation Act 1923** (the Act provides for compensation in case of injury by accident arising out of and during the course of employment);
- **Payment of Gratuity Act, 1972** (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years);
- **Employees PF and Miscellaneous Provision Act, 1952** (the Act provides for monthly contributions by the employer plus workers);
- **Maternity Benefit Act, 1951** (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.);
- **Contact Labor (Regulation and Abolition) Act, 1970** (the Act provides for certain welfare measures to be provided by the contractor to contract labour);
- **Minimum Wages Act, 1948** (the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the);
- **Payment of Wages Act, 1936** (it lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers);

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

### **3.1.5. World Bank Environmental Requirements**

#### **3.1.5.1. Operational Policies of the World Bank**

The following World Bank Operational Policies (OP) are relevant with respect to the proposed project and are reviewed below:

- OP 4.01 - Environmental Assessment
- OP 4.04 – Natural Habitats
- OP 4.11 – Physical Cultural Resources
- OP 4.12 – Involuntary Resettlement



- OP 4.36 – Forests

#### ***O.P. 4.01. Environmental Assessment***

O.P. 4.01 intends to help ensure the environmental and social soundness and sustainability of investment projects and to support integration of environmental and social aspects of projects into the decision making process.

OP 4.01 specifies the environmental screening to be carried out for each proposed project to determine the appropriate extent and type of EA to be carried out. Projects are classified into one of following four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

**Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. A comprehensive Environmental Impact Assessment Report is to be prepared for a Category A project.

**Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas – including wetlands, forests, grasslands, and other natural habitats – are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A Environmental Assessment.

**Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

Based on the assessment of project activities and their anticipated impacts, the selected corridors in the project has been categorized as "Category A Project" and requires a project specific EA and EMP.

#### ***O.P. 4.04. Natural Habitats***

The objective of this policy is to promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. Operational Policy 4.04 is applicable to the project, Since, Section 1 of Road no. 4 - Malliyakarai to Rasipuram section of SH 79 & Road no. 5 – Mohanur to Namakkal Section of SH 95 is abutting reserved forests areas.

#### ***O.P. 4.11. Physical Cultural Resources***

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Impacts on physical cultural resources should be addressed as an integral part of the EA

process. The following projects are to be classified during the environmental screening process as Category A or B:

- Any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and
- Any project located in, or in the vicinity of, a physical cultural resources site.

The proposed fast track corridor does not fall in any of the categories described above.

#### ***O.P. 4.12. Involuntary Resettlement***

The bank's policy on involuntary resettlement covers those displaced by the project's activities. For any sub-project involving land acquisition and associated impacts, a draft RAP is required, prior to the approval of sub-project and borrowers will implement the RAP in advance of sub-project implementation. Since land acquisition is involved in this sub-project, RAP is to be prepared for this sub-project.

#### ***O.P. 4.36. Forests***

The objective of this policy is to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. This policy applies to the following types of bank-financed investment projects:

Projects that have or may have impacts on the health and quality of forests;

Projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and

Projects that aim to bring about changes in the management, protection or utilization of natural forests or plantations, whether they are publicly, privately or communally owned.

The Bank does not finance projects that in its opinion would involve significant conversion or degradation of critical forest areas or related critical natural habitats. The project roads trigger the OP 4.36. Since, Section 1 of Road no. 4 - Malliyakarai to Rasipuram of SH 79 & Road no. 5 – Mohanur to Namakkal Section of SH 95 is abutting reserved forests areas. However, there is no conversion of critical forest areas or related critical natural habitats for proposed project improvement.

### **3.1.6. Summary of Clearance Requirement**

Summary of clearance required for the project roads under various regulations discussed above is presented in **Table 3.1**.

**Table 3.1. Environmental Regulations Applicable to Phase-I Roads under TNRSP-II PPC03**

Sl. No	Type of Clearance	Statutory Authority	Applicability	Project Stage	Time Required	Responsibility
1	Tree felling permission	District Collector & Forest Department	Felling of avenue trees	Pre construction	1 month	GoTN/ TNRSP

Sl. No	Type of Clearance	Statutory Authority	Applicability	Project Stage	Time Required	Responsibility
2	Consent to Establish under Air and Water Acts	Tamil Nadu Pollution Control Board	For establishing Hot mix plants, Crushers and batching plants	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
3	Consent to Operate under Air and Water Acts	Tamil Nadu Pollution Control Board	For operating Hot mix plants, Crushers and batching plants	Construction (Prior to work initiation)	1-2 months	Concessionaire / Contractor
4	Permission to store Hazardous wastes	Tamil Nadu Pollution Control Board	Storage, Transportation & Disposal of Hazardous Wastes	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
5	Explosive license	Chief Controller of Explosives, petroleum & Explosive Safety Organisation	Storage of explosive materials and Petroleum products	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
6	PUC certificate for vehicles for construction	Transport Department of Tamil Nadu	For all construction vehicles	Construction (Prior to work initiation)	1-2 months	Concessionaire / Contractor
7	Quarry lease deeds and license	Mines and Geology Department of Tamil Nadu	Quarrying and borrowing operations	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor
8	NOC for water extraction for construction and allied works	Central Ground Water Authority	Ground water extraction	Construction (Prior to work initiation)	2-3 months	Concessionaire / Contractor

# Chapter 4. Baseline Environmental Status

## 4.1. Background

Collecting the baseline environmental status of the project influence area helps to predict the magnitude of impacts that are likely to be caused due to the proposed improvements of the selected project roads on different environmental components of the project influence area. In order to assess the baseline environmental status of the project influence area, field visits were conducted by the Consultant. This involved field inspection at all the sensitive locations, collection of secondary information for all the environmental components and discussions with the officials of various departments, NGO's and local public.

Based on the existing environmental scenario potential impacts of road improvement will be identified and accordingly management plan will be proposed in forthcoming sections. The baseline environmental conditions will help in comparing and to monitor the predicted negative and positive impacts resulting from the project during construction and operation phases.

Data was collected from secondary sources for the macro-environmental setting like climate, physiography (Geology and slope), biological and socio-economic environment. Firsthand information have been collected to record the micro-environmental features within and adjacent to the project corridor. Collection of first hand (Primary) information includes preparation of base maps, extrapolating environmental features on proposed road design, tree enumeration, location and measurement of socio-cultural features abutting project road. Data was also recorded at sites used for extraction of materials for construction but generally outside the project corridor e.g. borrows areas and quarries.

Ambient Air, Noise and water quality samples were collected at important locations in terms of environment quality to prepare a baseline database. Consultation was another source of information to explain local conditions like submergence, recent floods etc. However these consultation results were largely based on short term memories like information on floods, submergence but still it was helpful in comparing secondary information.

As part of baseline environmental study, environmental monitoring was conducted for environmental attributes such as Air, Noise, Water and Soil. The sampling and monitoring locations were identified based on the land use type, topography and the sensitive receptors present along the project corridors. Environmental monitoring was conducted for one month between mid of February to mid of March. Ambient air quality was measured at 6 locations and the ambient noise level was measured at 12 locations. Ground water samples were drawn from 8 locations and Soil samples were collected from 5 locations along the project road. In addition to the baseline environmental monitoring, field inspection at all the sensitive locations, collection of secondary information for all the environmental components and discussions with the officials, NGO's and local public were conducted by the Consultants. A joint site inspection was conducted with Forest officials on 10<sup>th</sup> January, 2014 to identify the forest areas present along the Phase-I roads under TNRSP-II PPC03.

The baseline environmental status is presented in the following six environmental attributes:

- Air Environment
- Land Environment
- Water Environment
- Noise Environment
- Biological Environment
- Socio- economic and Health Environment

## 4.2. Study Area

To study the baseline environmental profile of the project area, the project impact zone has been classified in to two:

**Direct Impact Zone (DIZ):** This consists of the RoW and a strip of land within 50 m on either side of the RoW of the proposed alignment. Detailed inventory of environmental features has been carried out in this zone.

**Indirect Impact Zone (IIZ):** This consists of a strip of land within 10 Km aerial distance on either side of the proposed RoW. The presence of sensitive environmental features specifically mentioned in Section III of Annexure I (Form I) to the EIA Notification 2006 was identified in this zone.

The project corridors falls in two districts namely Salem and Namakkal in the State of Tamil Nadu.

Namakkal district is a newly formed district from Salem district. It came in to existence on 01.01.1997. The district is bounded by Salem on the north, Karur on the south, Trichy and Salem on the east and Erode on the West. Namakkal district is situated at 11° 00' and 12°00' of the North latitude and 77° 40' and 78° 05' of the East longitude.

Salem District is one of the biggest districts in Tamil Nadu. It is bounded on the North by Darmapuri district, on the South by Namakkal and Erode districts, the Western Ghats in the West and on the East by Villupuram district. District is situated at 11° 14' and 12° 53' of the North latitude and 77° 44' and 78° 50' of the East longitude.

## 4.3. Data Sources

Recent data on baseline environment component were collected from various sources of government departments, District and Taluk offices, literature and publications, websites etc. The general information of each district was collected from district hand book and their official websites. Details regarding the ground water were obtained from the reports of Central Ground Water Board. All meteorological data such as rainfall, temperature, relative humidity, wind speed and wind direction were collected from IMD, Pune. Baseline environmental monitoring programme for various environmental attributes was conducted during February-March, 2014 and the details thereof is presented in subsequent sections. Baseline environmental monitoring was conducted as per the guidelines of CPCB. NABL accredited and MoEF&CC approved, Aqua Designs India Pvt. Ltd., Chennai and Chennai Testing Labs, Chennai have conducted the baseline environmental monitoring for the project.

## 4.4. Air Environment – Baseline

Air environment is relatively free from pollution along the project road traversing through agrarian rural and small semi urban areas. As a part of the Environmental Impact Assessment (EIA), climatic component has been studied to establish the benchmarks to understand air quality in the project influence area.

### 4.4.1. Meteorological Factors and Climates

**Climate:** Among all other physical factors, climate is the most important factor-influencing environment because it plays a vital role in determining the evolution of landforms (erosion, soil characteristics), types of flora and fauna (ecological diversity), the productivity of ecosystems as well it has an influence on the pollution loads on the environment. Rainfall, temperature, and winds are the principal climatic components that serve to transport, disperse various forms of pollution into the atmosphere and on the ground.

India Meteorological Department (IMD) is the nodal agency responsible for monitoring and recording the climatic parameters. Long-term climatic data were obtained for the project districts to establish a general trend. Monthly average data for 30 years (1971-2000) were considered for analyzing the climatic variables like temperature, humidity and wind speed. Rainfall, the most critical climatic variable was analysed for its long-term trend (50 years; 1941-1990) and also for the recent phenomena (2008-2012).

Both Salem and Namakkal districts experience semi-arid tropical climate wherein four distinct seasons viz., South west monsoon (June – Sep.), North East monsoon (Oct – Dec.), winter season (Jan. – Feb.) and summer season (April – May) are experienced.

**Temperature:** Temperature pattern for Namakkal and Salem districts are shown in **Table 4.1** and **Table 4.2**.

**Table 4.1. Temperature Profile of Salem District**

Month	Monthly Temperature Values (°C)		
	Maximum	Minimum	Mean
Jan	31.80	19.48	25.64
Feb	34.36	21.01	27.67
Mar	36.93	23.20	30.05
Apr	37.92	25.62	31.75
May	37.48	25.32	31.38
June	35.27	24.51	29.88
Jul	34.16	23.85	29.00
Aug	33.69	23.53	28.59
Sep	33.66	23.31	28.48
Oct	32.46	22.88	27.66
Nov	31.27	21.69	26.47
Dec	30.55	20.10	25.30
<b>Avrg</b>	<b>34.13</b>	<b>22.89</b>	<b>28.49</b>

Source: Data Collected from IMD, Pune

**Table 4.2. Temperature Profile of Namakkal District**

Month	Monthly Temperature Values (°C)		
	Maximum	Minimum	Mean
Jan	26.30	14.58	20.43
Feb	28.24	15.71	21.97
Mar	30.36	17.69	24.02
Apr	31.22	19.81	25.52
May	30.96	20.12	25.54
Jun	28.65	19.48	24.07
Jul	27.65	18.96	23.31
Aug	27.53	18.74	23.14
Sep	27.74	18.46	23.12
Oct	26.79	18.03	22.41
Nov	25.61	16.87	21.25
Dec	25.31	15.44	20.37
<b>Avrg</b>	<b>28.03</b>	<b>17.82</b>	<b>22.93</b>

Source: Data Collected from IMD, Pune

Maximum temperature recorded in the months of March-May and minimum temperature recorded in the months of November to February at both Salem and Namakkal. The monthly mean temperature varies from 20.0 to 26.0 degrees at Namakkal, whereas the monthly mean temperature varies between 25.0 to 32.0 degrees at Salem.

**Rainfall:** Rainfall at Salem district is moderate. Rainfall in Salem district is for the period of 2008-12 presented in **Table 4.3**. The average rainfall for the first 5 years (2008-12) works out to 1049.64 mm, which is higher than the State average of 943 mm. However, the long term average rainfall for Salem is only 898 mm. No. of average rainy days per year is 52. The north east monsoon period is the major rainy season accounting for 36% of the normal rainfall, followed by southwest monsoon (45%).

**Table 4.3. Monthly Rainfall in Salem District**

Month	Monthly Rainfall (in mm) at Salem District					Monthly Average
	2008	2009	2010	2011	2012	
Jan	4.6	2.3	0.6	2.4	0	2.0
Feb	10.4	0	0	6.3	0	3.3
Mar	99.4	16.9	2.8	20.5	0	27.9
Apr	35.5	42.4	21.9	144.1	36.1	56.0
May	132.2	130.4	129.2	46.8	79.2	103.6
Jun	53.1	64.7	124.5	38.5	52.4	66.6
Jul	95.8	63.2	111.9	85.3	99.4	91.1
Aug	262.6	165.5	202.8	184.1	144.6	191.9
Sep	72.5	167.9	106.6	140.5	144.6	126.4
Oct	163.2	56.1	165	170.7	198.3	150.7
Nov	197.0	142.8	328.7	229.6	62	192.0
Dec	13.2	44.7	70.5	47.0	14.9	38.1
<b>Annual Rainfall</b>	<b>1139.50</b>	<b>896.90</b>	<b>1264.50</b>	<b>1115.80</b>	<b>831.50</b>	

Source: <http://www.imd.gov.in/>

Namakkal is one the dry district of Tamil Nadu state and is one of the six districts in the state receiving less than 800 mm annual rainfall on an average. The average rainfall at Namakkal district for a period of 2008-12 works out to 758.2 mm, which is lower than the State average of 943 mm. The long-term average rainfall for Namakkal is 776 mm. The average rainfall days in a year is 44mm. The

northeast monsoon period is the major rainy season accounting for 41% of the normal rainfall, followed by southwest monsoon (37%). Rainfall in Namakkal district for a period of 2008-12 is presented in **Table 4.4**.

**Table 4.4. Monthly Rainfall in Namakkal District**

Month	Monthly Rainfall (in mm) at Namakkal District					
	2008	2009	2010	2011	2012	Monthly Average
Jan	6	0	0	2.2	0.1	1.7
Feb	0.4	0	0	8.5	0	1.8
Mar	85.4	25.1	0	4.1	0	22.9
Apr	49.4	12.2	18	152.8	35.3	53.5
May	103.8	118.6	116.6	80.6	33.3	90.6
Jun	17.6	22.3	58.6	9.4	1.9	22.0
Jul	70	9.1	68.9	55	55.6	51.7
Aug	231.6	105.8	100.3	116.2	63.1	123.4
Sep	61.6	113	75.8	75.9	84.1	82.1
Oct	126.9	34.5	118.7	175.7	164.3	124.0
Nov	192.4	136.9	258.8	147.2	53.4	157.7
Dec	12.2	36.1	51.5	33.6	0.6	26.8
<b>Annual Rainfall</b>	<b>957.30</b>	<b>613.60</b>	<b>867.20</b>	<b>861.20</b>	<b>491.70</b>	

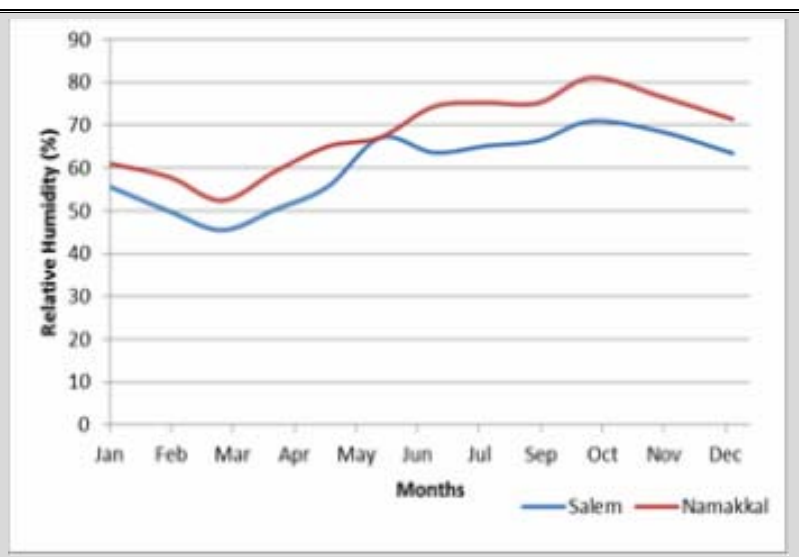
Source: <http://www.imd.gov.in/>

January to March is dry period for both the districts. Highest rainfall is receiving in the North East Monsoon than the South West Monsoon.

**Relative Humidity:** The nature and characteristics of the pollutants will vary with change of the humidity in the atmosphere. Fog provides possibility for suspended particles to coalesce and enhances chemical reaction of the gaseous pollutants.

**Table 4.5. Comparison of Average Monthly Relative Humidity of the Project District**

Month	Average Relative Humidity (%)	
	Salem	Namakkal
Jan	55.64	61.05
Feb	49.87	57.86
Mar	45.52	52.41
Apr	50.31	59.19
May	55.65	65.05
Jun	67.1	67.19
Jul	63.61	74.34
Aug	65.17	75.23
Sep	66.44	75.24
Oct	70.97	81.1
Nov	68.45	76.61
Dec	63.43	71.41



Source: Data collected from IMD, Pune

In general, Namakkal district records higher relative humidity due to the hill areas surrounding the district. Relative humidity variation between day and night are higher resulting in higher probability of pest and disease incidences. The highest humidity recorded in the month of October which is 81.1% and the lowest humidity recorded in the month of March, which is 52.41%.



In Salem district, relative humidity is high during the south west monsoon period and generally moderate in the rest of the year. But on an average the relative humidity is low at Salem compared to that of Namakkal. The humidity in the summer afternoons is comparatively very low. The highest humidity recorded in the month of October (~ 71%) and the lowest in the month of Mar (~ 46 %).

### Wind Speed:

Wind speed and wind direction have a significant role on the dispersion of atmospheric pollutants and therefore, the air quality of the area. Ground level concentrations for the pollutants are inversely proportional to the wind speed in the down wind direction, while in upwind direction no effect will be observed and in cross wind direction partial effect due to the emission sources is observed.

**Table 4.6. Comparison Average Monthly Wind Speed of the Project Districts**

Month	Wind Speed (Km/hr)	
	Salem	Namakkal
Jan	3.85	6.08
Feb	3.85	5.96
Mar	4.25	6.84
Apr	4.44	6.76
May	3.77	7.64
Jun	4.36	11.6
Jul	4.06	11.29
Aug	3.72	10.37
Sep	2.79	7.38
Oct	2.45	5.91
Nov	2.81	5.15
Dec	3.4	7.95

Source: Data collected from IMD, Pune

In Namakkal district, during October to March, wind blows generally from North Easterly and Easterly directions. South westerly and westerly winds predominate from May to September. The wind speed is least in October to February, while it is higher from July to September.

Winds are generally light to moderate with some strengthening in monsoon season in Salem district. The region is influenced by winds from south-west and north-west during the period from May to September and from north-east and south-east during the period from October to April.

**Ombrothermic Analysis:** Water balance is one of the main environmental conditions that influence the vulnerability of a region to climate change. Ombrothermic analysis uses two indicators – precipitation (ombro) and temperature (thermic) – to assess the spatial extent of vulnerability of a region to climate change. Ombrothermic analysis uses humidity/aridity indices and graphics to integrate temperature and precipitation data over time. Using readily available temperature and precipitation data, the method produces graphics and maps that can identify vulnerable areas that may be prone to humidity (excessive rainfall) or aridity (drought). Also this analysis helps to identify the wet and dry months at a region.

The ombrothermic graphs for Salem and Namakkal districts are given **Figure 4.1**.

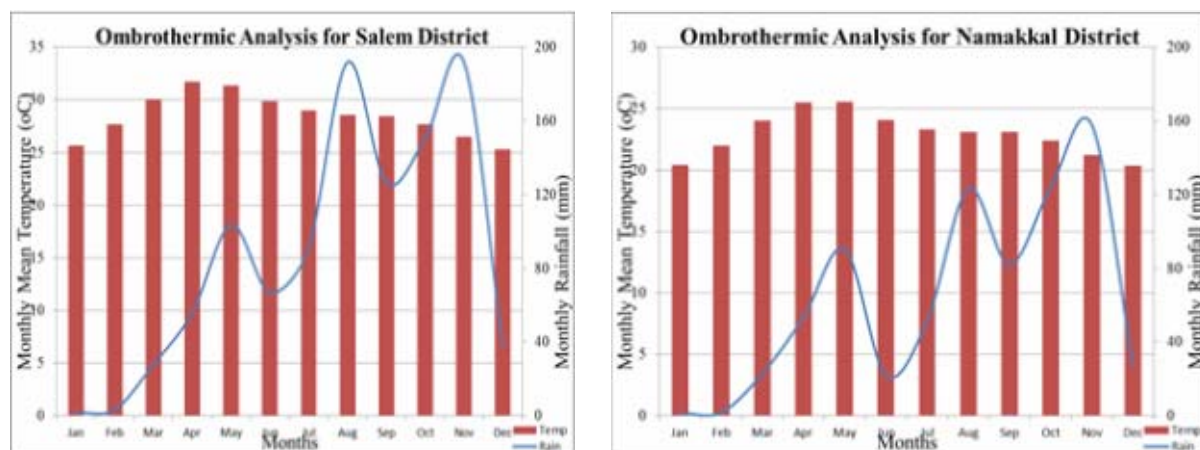


Figure 4.1. Ombrothermic Analysis for the Project Districts.

#### 4.4.2. Ambient Air Quality

Ambient air quality refers to the background air quality levels in a region, characterised by concentrations of various pollutants in the atmosphere. The presence of air pollutants and their concentrations depends on the type of polluting sources, and other factors that influence their flow and dispersion. In most cases vehicular emissions are the predominant source of air pollution. Existing ambient air quality data on various sections of the project corridors was collected to establish a baseline database. The aim was to identify areas that already have high pollution levels or are expected to experience so, on account of the road project, and to design adequate mitigation measures, as applicable.

The activities, which modify atmospheric air quality are transportation (i.e., motor vehicle emissions, which are addressed in this study); industry; domestic and construction. The major pollutants of significance to roadside air quality, on account of vehicular emissions, are Fine Particulate Matter (PM<sub>2.5</sub>), Respirable Particulate Matter (PM<sub>10</sub>), Sulphur dioxide (SO<sub>2</sub>), Nitrogen oxides (NO<sub>x</sub>), and Carbon monoxide (CO).

No secondary data on air quality for the Phase-I roads under TNRSP-II was available for the Namakkal & Salem districts. However, Tamil Nadu Pollution Control Board has published the annual mean concentration of air pollutant level for SO<sub>2</sub>, NO<sub>2</sub> and RSPM for the year 2004. Monitoring was conducted at Sowadswari Collect building, a residential area in Salem town. The result shows that, the air quality parameters are falling within the NAAQ Standards.

Ambient air quality along the project roads is generally good in condition due to the absence of any major industries near to the project corridors. The project envisages improvement of project roads which will ease the traffic flow reducing emission of air pollutants. Since project roads generally pass through agricultural lands, it is not expected to have any negative impact on air quality. Further, the topography of the project influence area support dispersion of pollutants to a great extent.

Ambient Air quality monitoring was conducted along the project roads as part of baseline environmental monitoring. The prime objective of the baseline air quality study is to establish the existing ambient air quality of the study area. This will be useful for assessing the conformity to standards of ambient air quality during construction and operation phase.

**Monitoring locations:** Factors that modify emission of air pollutants are traffic features (volume, speed, composition and mode), vehicle maintenance levels, road geometry and areas of congestion. To assess the ambient air quality along the project corridors, ambient air quality monitoring was carried out at identified locations. The monitoring locations were selected based on the sensitivity of the receptors to vehicular traffic and to obtain baseline concentrations of the various representative land uses along the corridors. Locations of the monitoring stations are presented in **Table 4.7**.

**Table 4.7. Details of Ambient Air Quality Monitoring Locations**

Sl. No	Name of the Location	Monitoring Locations & Environmental Setting
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>		
1	Meenkinar	At Km 57+200, Main land use is agriculture and rural settlements
2	Kandampalayam	At Km 65+000, commercial center, Govt. HSS and Govt. PHCs are proximity to the location, high traffic during peak hours
3	Mavureddy	At Km 79+000, residential area proximity to Paramathy town with medium traffic.
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>		
1	Malliyakarai	At Km 0+200, rural settlement with medium traffic and District Primary Heath Center is close to the location.
2	Mangalapuram	At Km 14+000, mainly commercial area, proximity to Govt. High School, culturally significant structures and small scale industries
3	Near Bailnadu RF	At Km 24+400, mixed land use i.e. near to Reserved Forest.
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>		
1	Koppanpatti	At Km 51+800 at residential area with medium traffic
2	Vaiyappamalai	At Km 54+600, near to Govt. HSS, major settlement with heavy traffic
3	Elachipalayam	At Km 62+500, near commercial area surrounded by scattered settlements
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>		
1	Mohanur	At Km 0+600, near to bus stand, Mohanur, major settlement with heavy traffic
2	Aniyapuram	At Km 9+900 near to Arumugham Udaiyar Govt. Higher Secondary School, Aniyapuram, Rural settlement
3	Near Veterinary University	At Km 12+400 near to Tamil Nadu Veterinary & Animal Science University, surroundings are characterized by a number educational institutions

The parameters that will be measured during the monitoring along with their frequency of sampling are given in **Table 4.8**.

**Table 4.8. Details of Ambient Air Quality Parameters and its Sampling Frequency**

Parameters	Sampling Frequency
Particulate Matter 2.5, PM <sub>2.5</sub>	Sample for 24 hours – two days per week continuously for one month.
Particulate Matter 10, PM <sub>10</sub>	
Sulphur dioxide, SO <sub>2</sub>	Sample for 8 hours (three 8 hour samples in 24 hours) – two days per week continuously for one month.
Oxides of Nitrogen, NO <sub>x</sub>	
Carbon Monoxide, CO	

Analysis techniques used for different air quality parameters are presented in **Table 4.9**

**Table 4.9. Methodology used for the Analysis of Ambient Air Quality**

Sl. No	Parameter	Technique	Technical Protocol	Minimum Detectable Limit
1	Particulate Matter 2.5 (PM <sub>2.5</sub> )	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part-4)	1.0 µg/m <sup>3</sup>
2	Particulate Matter 10 (PM <sub>10</sub> )	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part-4)	1.0 µg/m <sup>3</sup>
3	Sulphur Dioxide	Modified West and Gaeke	IS - 5182 (Part-2)	4.0 µg/m <sup>3</sup>
4	Nitrogen Oxide	Modified Jacob & Hochheiser	IS - 5182 (Part-6)	4.0 µg/m <sup>3</sup>
5	Carbon Monoxide	Non Dispersive Infra Red Spectroscopy (NDIR)	IS-5182 (Part-10)	1.0 ppm
6	Hydrocarbon	Gas Chromatography	IS-5182 (Part-17)	0.1 ppm

The monitoring results are presented in **Table 4.10** along with revised CPCB ambient air quality standards. The results indicate that all the parameters are within the limits of revised NAAQ standards at all locations.

**Table 4.10. Ambient Air Quality along the Phase-I roads under TNRSP-II**

Location	Parameters														
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )			PM <sub>10</sub> (µg/m <sup>3</sup> )			SO <sub>2</sub> (µg/m <sup>3</sup> )			NO <sub>x</sub> (µg/m <sup>3</sup> )			CO (mg/m <sup>3</sup> )		
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>															
Meenkinar	29.2	42.5	35.21	56.0	83.6	69.56	6.9	23.9	12.31	19.5	33.0	24.16	<1.15	<1.15	<1.15
Kandampalayam	31.2	45.3	37.23	62.8	81.7	71.87	8.83	19.73	13.81	21.7	31.3	25.47	<1.15	<1.15	<1.15
Mavureddy	18.3	28.4	23.01	40.2	59.6	50.37	3.8	7.6	5.26	11.9	19.1	15.73	<1.15	<1.15	<1.15
<b>Malliyakarai to Rasipuram Section of Road No.4. (SH 79)</b>															
Malliyakarai	23.5	53.75	35.33	56.9	111.6	76.11	9.5	14.45	12	20.03	33.56	27.09	<1.15	<1.15	<1.15
Mangalapuram	22.08	37.5	29.91	54.48	84.5	67.73	8.89	14.17	11.58	22.8	31.29	26.51	<1.15	<1.15	<1.15
Near Bailnadu RF	19.68	25.5	22.5	45.33	61.2	54.01	8.07	15.84	11.75	17.13	38.58	26.5	<1.15	<1.15	<1.15
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>															
Koppanpatti	18.65	37.08	28.09	47.02	78.33	62.36	9.46	11.07	10.18	18.03	29.8	24.66	<1.15	<1.15	<1.15
Vaiyappamalai	26.25	42.50	32.04	64.99	86.54	72.64	9.12	15.5	12.59	22.9	37.64	29.2	<1.15	<1.15	<1.15
Elachipalayam	21.67	33.7	28.31	58.81	77.4	67.88	9.64	12.76	11.26	20.43	37.96	26.90	<1.15	<1.15	<1.15
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>															
Mohanur	29.2	45.3	34.3	58.1	85.6	70.51	8.4	18.5	11.74	20.2	27.7	23.72	<1.15	<1.15	<1.15
Aniyapuram	25.4	41.7	35.30	65.3	82.7	69.23	9.7	17.2	13.31	16.6	31.1	22.65	<1.15	<1.15	<1.15
Near Veterinary University	18.4	37.5	26.0	48.5	70.5	56.61	3.0	11.3	6.59	14.2	28.7	20.44	<1.15	<1.15	<1.15
<b>Revised CPCB Standards</b>															
Industrial, Residential, Rural & other Areas			60			100			80			80			2
Ecologically Sensitive Areas (Notified by Central Government)			60			100			80			80			2

Source: Baseline Environmental Monitoring done by Chennai Testing Labs, Chennai and Aqua Design, Chennai

## **4.5. Land Environment – Baseline**

The land environment describes the baseline aspects of the nature and geomorphic features, soil conditions and quality, borrow and material resources and land use characteristics. Portion of this section has analyzed role of these landscape features in road improvement.

The components of land environment discussed in this section includes,

- Geography and Topography
- Geology and Minerals
- Soil Characteristics
- Land Use
- Landslide / Landslip Problem
- Agriculture

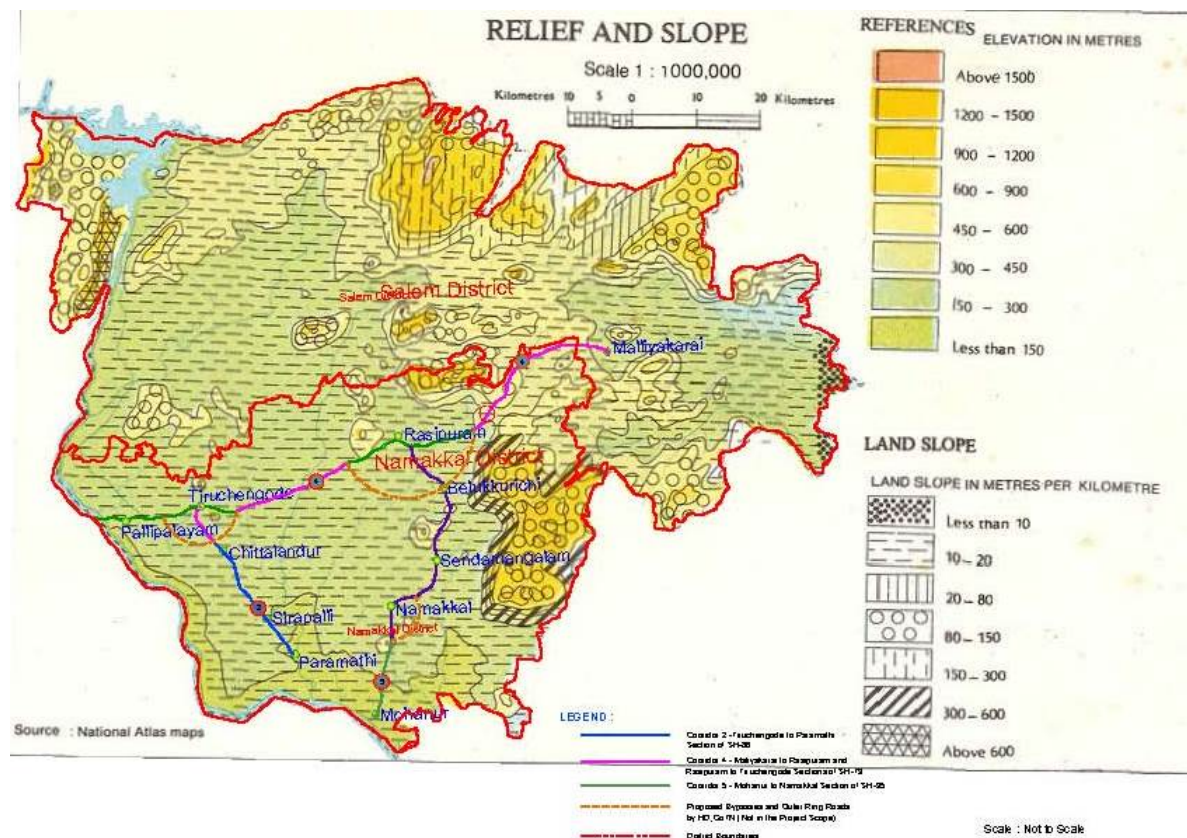
### **4.5.1. Geography and Topography**

The northern portion of Namakkal is mountainous and the southern areas are plains. The plain area of the district can be divided into 3 elevation stages. The lower elevation (below 150 m) has Namakkal and Paramathy taluks which are being benefited by Cauvery River. The mid elevation (150-300 m above M.S.L.) occupies the major area in all taluks. The high elevation area are the Kollimalai range, with peaks 1219 m, spreads over mainly in Rasipuram and Namakkal taluks. The average altitude of the district is 300 m above MSL.

Salem district is one of the largest districts in Tamil Nadu. The elevation of landscape generally ranges from 150 m to 400 m above MSL with the exception of Yercaud, which is at 1500 m above MSL.

Salem district is intersected by numerous hills. Shervroy Hills and Kalrayan Hills adorn the district with natural beauty and forest wealth. The district forms part of the upland plateau region of Tamil Nadu with many hill ranges, hillocks and undulating terrain with a gentle slope towards east. The prominent geomorphic units identified in the district through interpretation of satellite imagery are 1) Plateau, 2) Structural hills, 3) Bazada zone, 3) Valley fill, 4) Pediments, 5) Shallow Pediments and 6) Buried Pediments.

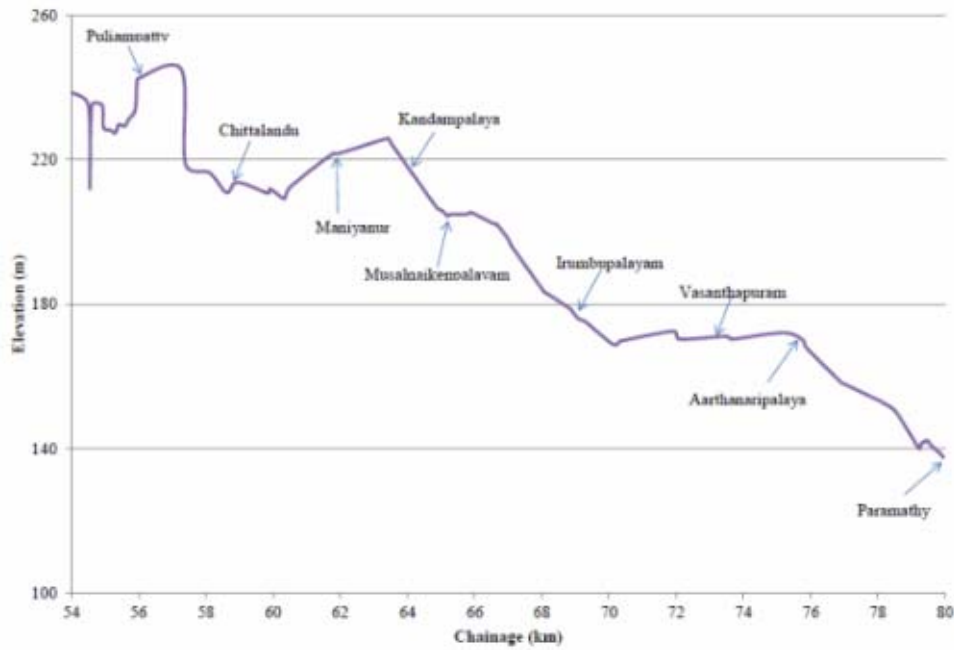
Topographically project region is plain area with scattered hillock. The relief and slope of the project area is depicted in **Figure 4.2**.



**Figure 4.2. Map of the Project Districts showing the Profile of Relief and Slope.**

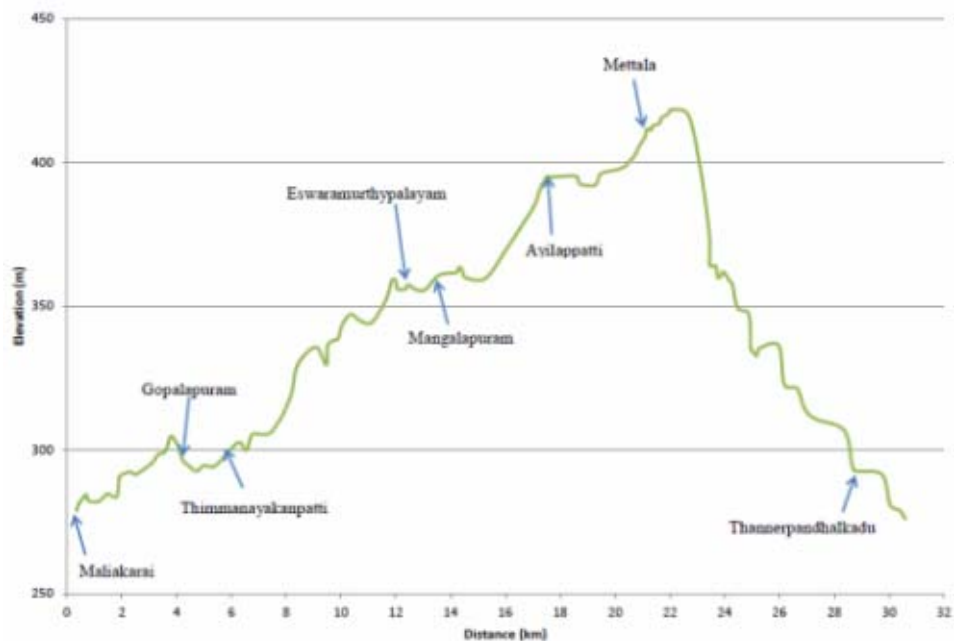
The Phase-I roads under TNRSP-II are passing through mainly plain and rolling terrain. Graphical representation of elevation profile of the project corridors are depicted in **Figure 4.3** to **Figure 4.6**. The Tiruchengode to Paramathy Section of Road No. 2 (SH 86) and Malliyakarai to Rasipuram section of Road No. 4 show the highest variation in elevation along the project stretch. Rasipuram to Tiruchengode section of Road No. 4 and Mohanur to Namakkal section of Road No 5 are relatively plain stretches.

The Tiruchengode to Paramathy section of Road No. 2 is having very dropping elevation profile, with the highest elevation of the project road 245 m at the beginning (Pulliyampatti) and 138 m at the end point (Paramathy), giving a drop of 113 m for the project stretch.



**Figure 4.3. Elevation Profile of Tiruchengode to Paramathy Section of Road No. 2 .**

The Malliyakarai to Rasipuram section of Road No. 4 is having very undulating elevation profile. The stretch is having elevation profile of triangular shape with the starting point (Malliyakarai) and the end point (Namagiripettai) having elevation ~276 m, whereas the highest elevation is at reserve forest locations, 418 m. So, the stretch is having a rise and drop of 142 m within a length of 32.6 Km.



**Figure 4.4. Elevation Profile of Malliyakarai to Rasipuram Section of Road No.4**

Comparatively, Rasipuram to Tiruchengode section of Road No. 4 is having level profile, but having lots of ups and downs through the project stretch. The maximum drop in elevation, within the project stretch is only 47 m, the highest elevation being 231 m, and the lowest elevation 184 m (at Elachipalayam).



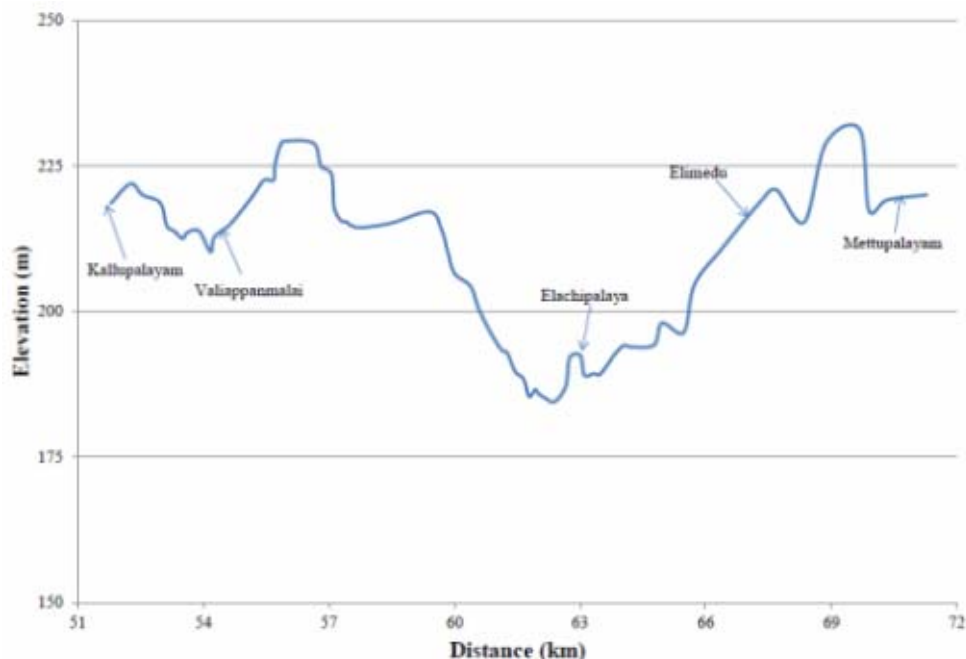


Figure 4.5. Elevation Profile of Rasipuram to Tiruchengode Section of Road No. 4

The Mohanur to Namakkal Section of Road No.5 is having a rising elevation from 121 m (Mohanur) to 197 m (Lathwadi), thus having an elevation difference of 76 m within the project stretch.

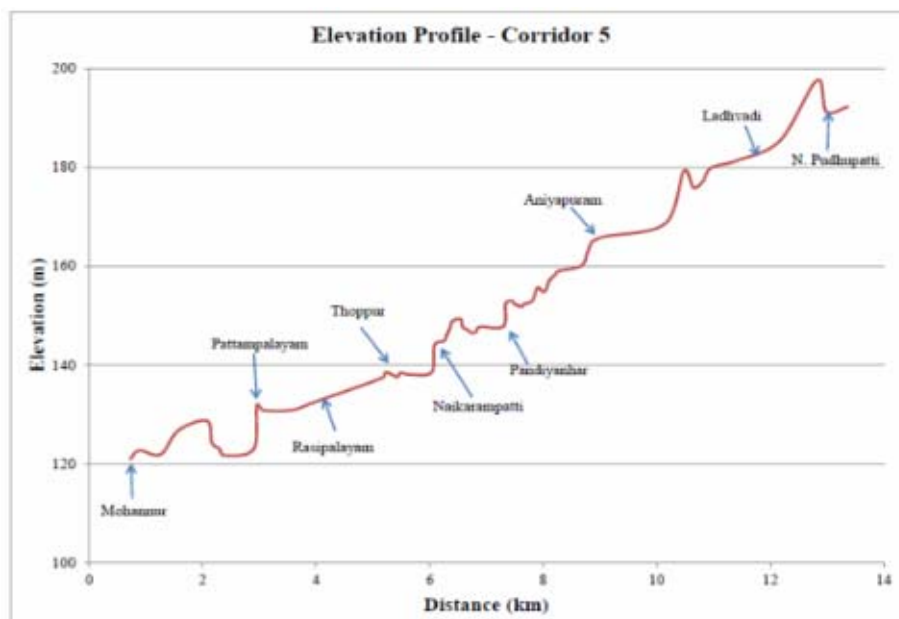


Figure 4.6. Elevation Profile of Mohanur to Namakkal Section of Road No. 5

#### 4.5.2. Geology and Mineralogy

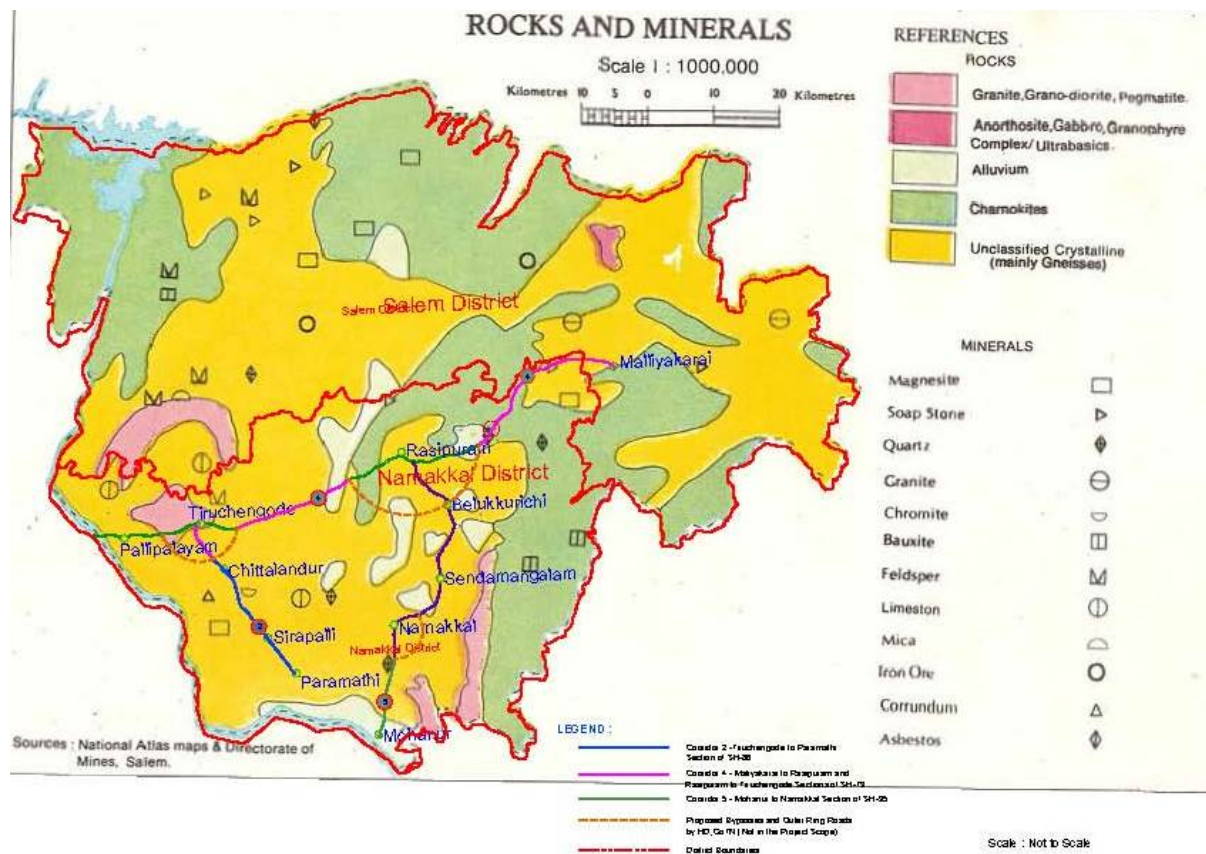
Namakkal district consists of mainly black and multi-color granite, Charnockite and Limestone rocks. The mineral deposits in the district include Bauxite, Quartz, Feldspar, Platinum and manganese. Recently, Geological Survey of India has found platinum prospects in Namakkal district.

The predominant geological formations of Namakkal district are Alluvium, Colluvium, Laterite, Granite, Dolerite, Quartzite, Charnockite and Granite Gneiss.

A major part of the mineral wealth of the Tamil Nadu is confined to Salem District, where a variety of important minerals like Magnesite, Dunite, Bauxite, Limestone, Iron ore, Quartz, Feldspar and Soapstone, Granites etc., are found. There are 83 Major minerals mines, 108 black & colour granite quarries and 35 rough stone quarries in Salem District.

The predominant geological formations of Salem district are Alluvium, Colluvium, Laterite, Granite, Dolerite, Quartzite, Charnockite and Granite Gneiss. Salem district finds very important place in the rocks & mineral map of Tamil Nadu. Bauxite, Dunite, magnetite, quartz, limestone, soapstone and granite are important minerals available in the district.

The Phase-I roads under TNRSP-II are passing through rich rock deposit areas in the project districts. This needs blasting or mechanical drilling for the proposed project improvements. **Figure 4.7** reveals the rocks and minerals along the project corridors.



**Figure 4.7. Map of the Project Districts showing the Profile of Rocks and Minerals**

**Seismicity and Volcanic Activity:** Seismicity / Effect due to earthquake has been accounted for by considering the seismic load in longitudinal and transverse direction. For the purpose of determining the seismic forces the country is divided into four zones (Zone II to Zone V) based on the intensity of earthquakes that a particular area may be subjected to, with Zone V comprising of areas which have been subjected to severe earthquakes & Zone-II comprising areas least liable to earthquakes (source: <http://www.imd.gov.in/section/seismo/static/seismo-zone.htm>). The seismic loads are calculated using Response Spectrum method as per Modified clause of IRC 6: 2010. The seismic force depends upon

several factors like zone factor, Period of vibration, Soil type etc. The seismic load in longitudinal and transverse direction is found out separately. As per the seismic zone classification of India, the project districts fall in zone III & zone II, i.e. moderate and least active categories. The Project site falls in both Zone II & III of seismic map (Figure 4.8) and relevant provisions in IRC-6:2010 have been adopted in the design.

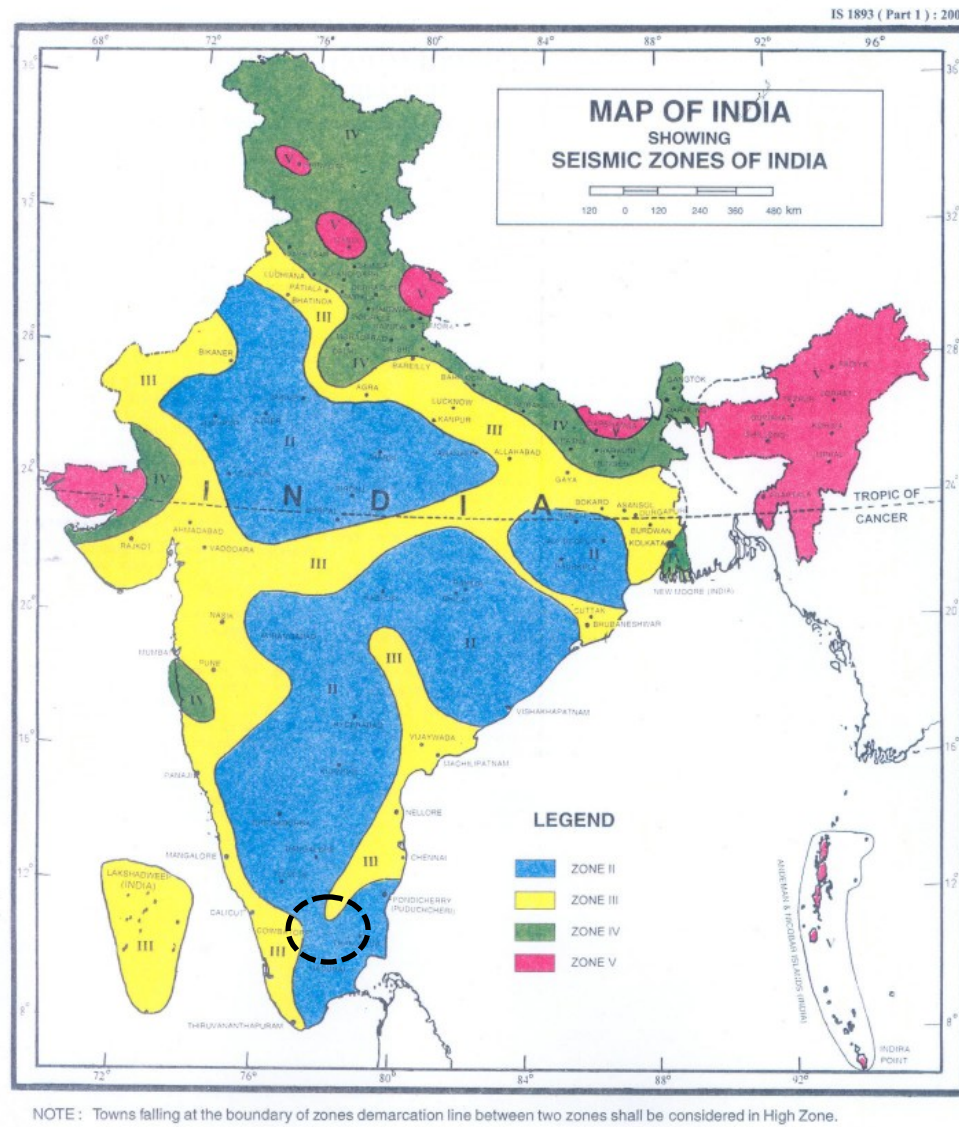


Figure 4.8. Map showing Seismic Zones of India

The whole project area falls in the vast volcanic basalt beds of Deccan plate, which formed towards the end of Cretaceous period, between 65 and 67 million years ago. There is no recent seismic and volcanic activity reported along the project area.

### 4.5.3. Soil Characteristics

The soils of the Namakkal district can be classified under 6 categories viz., Red loam, Lateritic, Black, Sandy Coastal alluvial, Red sandy and Clay loam. The block wise distribution of soil is presented in **Table 4.11**.

**Table 4.11. Soil Types and their Distribution in Namakkal District**

Sl. No.	Type of Soil	Blocks in Namakkal District
1.	Red loam	Namakkal, Elachipalayam, Puduchatram, Mallasamudram, Rasipuram, Tiruchengode, Paramathy and Parts of Pallipalayam.
2.	Lateritic soil	Kollihills
3.	Black soil	Erumapatty, Kabilarmalai, Mohanur, Namagiripet and Parts of Pallipalayam.
4.	Sandy coastal alluvial	Kabilarmalai
5.	Red sandy soil	Puduchatram
6.	Clay loam	Sendamanalam, Vennandhur, Erumapatty

Source: Office of the Joint Director of Agriculture, Namakkal

It could be seen from the table that majority of the area in the district is covered by red loamy soil followed by the black soil and clay loam. The red loamy soils are suitable for cultivation of crops under both rain fed and irrigated conditions. The lateritic soils which are little acidic in nature is found in the Kolli hills region of the district. The soil is suitable for cultivation of some fruit crops and plantation crops like Cardamom in the higher reaches. Sandy coastal alluvial soil is found adjoining the river and canal irrigated areas in the Kabilarmalai block. The red sandy soil dominates the Puduchatram block.

The soils in Salem district can be broadly classified into 6 major soils types viz., Red *in-situ*, Red Colluvial Soil, Black Soil, Brown Soil, Alluvial and Mixed Soil. Major part of the district is covered by Red insitu and Red Colluvial soils. The soil distribution in the taluks of Salem district is given in the **Table 4.12**.

**Table 4.12. Soil Types and their Distribution in Salem District**

Sl. No.	Type of Soil	Blocks in Salem District
1.	Black soil	Salem, Attur, Omallur, Sankari
2.	Brown	Yercaud, Salem, Omallur
3.	Alluvial	Omallur, Sankari

Source: Office of the Joint Director of Agriculture, Salem

Soils profile of the PIA of Phase-I roads under TNRSP-II are varying from are Red soil, Black soil Brown soil to Mixed soil. **Figure 4.9** gives the details of soil types found along the project road.

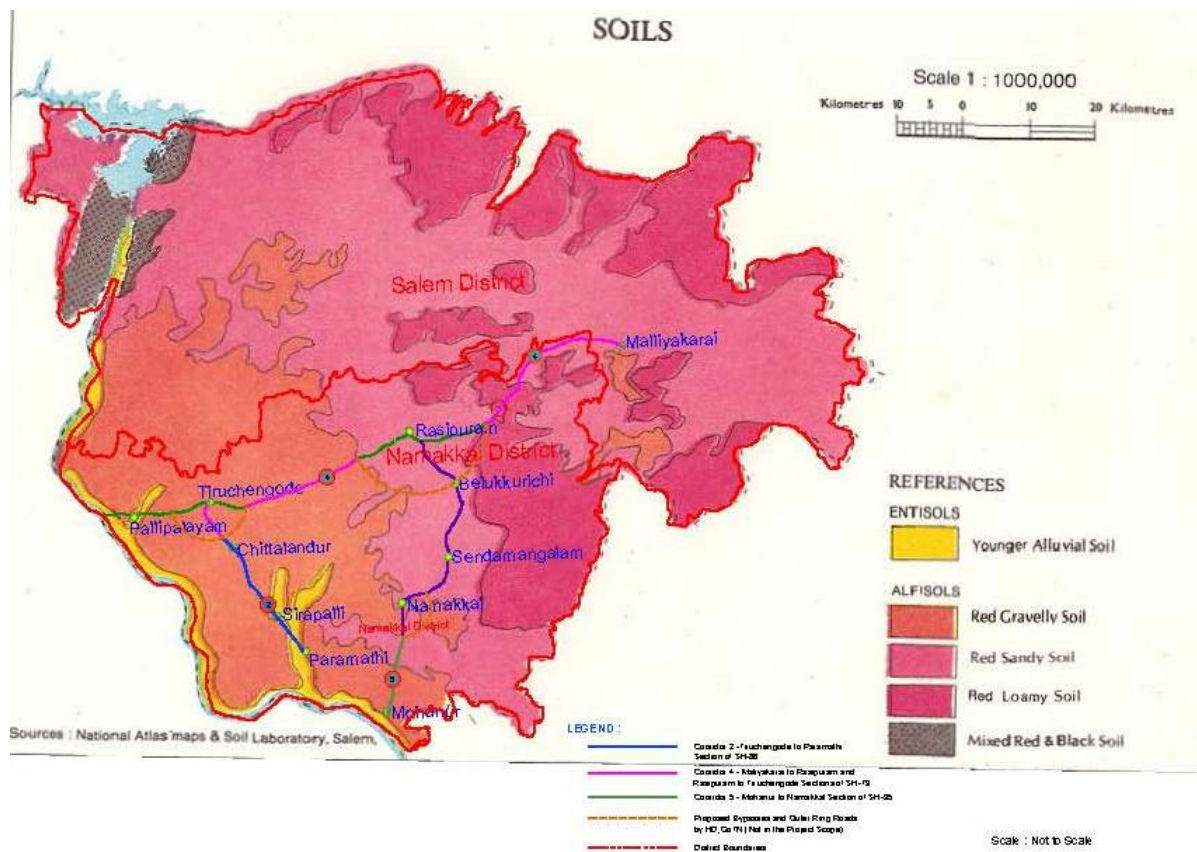


Figure 4.9. Map of Project Districts Showing the Soil Types

In order to have a better understanding of soil characteristics of the project area, soil samples were taken and analysed for all important parameters at pre-selected locations. Soil sampling locations for the Phase-I roads under TNRSP-II are presented in **Table 4.13**. Results of the soil sample analysis are presented in **Table 4.14**.

Table 4.13. Details of Soil Sampling Locations along the Project Roads

Sl. No.	Name of the Location	Monitoring Locations & Environmental Setting
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>		
SQ1	Meenkinar	At Km 57+200 near to the start point, main land use is agriculture and rural settlements
SQ2	Kandampalayam	At Km 65+200, busy settlement along the project corridor characterized by commercial activities
SQ3	Mavureddy	At Km 79+600 near to the end point, mainly residential area
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>		
SQ1	Malliyakarai	At Km 0+200 near to DPH, rural settlement, surrounded by dense scrub forest and cultivated lands
SQ2	Mangalapuram	At Km 14+000, a medium settlement characterised by commercial activities.
SQ3	Near Bailnadu RF	At Km 24+600, rural settlement with agricultural lands. Reserve Forests are proximity to the location

<b>Sl. No.</b>	<b>Name of the Location</b>	<b>Monitoring Locations &amp; Environmental Setting</b>
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>		
SQ4	Elachipalayam	At Km 62+500, a medium settlement characterized by commercial activities.
SQ5	Mettupalayam	At Km 71+00, near to the end point, rural settlement characterized by irrigated agricultural lands.
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>		
SQ1	Aniyapuram	At Km 11+000 near to Saravumalai RF, rural settlement characterized by poultry farms and cultivated lands.

**Table 4.14. Result of Soil Sample Analysis**

Sl. No	Test Parameters	Road No 2			Road No. 4					Road No. 5
		SQ1	SQ2	SQ3	SQ1	SQ2	SQ3	SQ4	SQ5	SQ1
1	Texture	Loam Soil	Loam Soil	Loam Soil						Loam Soil
	a) Sand				70.1%	42.8%	61.5%	71.1%	65.5%	
	b) Silt				29.9%	14.4%	30.7%	24.4%	25.8%	
	c) Clay				0.0%	42.8%	7.8%	4.5%	8.7%	
2	Soil Type	Silt	Silt	Silt	Loamy Sand	Sandy Clay	Sandy Loam	Loamy Sand	Loamy Sand	Silt
3	Colour	Brown	Brown	Light Brown	Very Dark Red	Reddish Yellow	Reddish Yellow	Reddish Yellow	Dark Brown	Brown
4	Moisture Content	0.5%	0.39%	0.59%	2.9%	5.17%	4.7%	7.1%	2.3%	2.09%
5	Electrical Conductivity at 25 <sup>0</sup> C (1:5 Soil Extract)	297µs/cm	283297µs/cm	206297µs/cm	230µmhos/cm	124µmhos/cm	207µmhos/cm	135µmhos/cm	110.5µmhos/cm	414297µs/cm
6	pH at 25 <sup>0</sup> C	8	6.8	8.4	6.94	8.24	8.44	8.48	7.80	8.5
7	Organic Carbon	0.48%	0.27%	0.20%	5940 mg/100gm	5850 mg/100gm	6430 mg/100gm	4860 mg/100gm	5680 mg/100gm	0.68%
8	Nitrogen as N	712 mg/kg	667 mg/kg	685 mg/kg	28 mg/100gm	27.5 mg/100gm	26.4 mg/100gm	29.0 mg/100gm	27.5mg/100gm	628 mg/kg
9	Phosphorous as P	403 mg/kg	363 mg/kg	930 mg/kg	114.2 mg/100gm	118.4 mg/100gm	102.2 mg/100gm	571.6 mg/100gm	707.1 mg/100gm	353 mg/kg
10	Potassium as K	0.49%	0.20%	0.31%	97.4 mg/100gm	342.5 mg/100gm	134.9 mg/100gm	122.9 mg/100gm	97.1 mg/100gm	0.13%
11	Chloride as Cl	115 mg/kg	77 mg/kg	94 mg/kg	15.5 mg/100gm	7.50 mg/100gm	9.24 mg/100gm	12.9 mg/100gm	6.87 mg/100gm	110 mg/kg
12	Sodium as Na (Available)	0.10%	0.09%	0.12%	25.01 mg/100gm	22.4 mg/100gm	60.5 mg/100gm	26.1 mg/100gm	10.2 mg/100gm	0.19%
13	Sodium Absorption Ratio	18.8	18.7	25.7	15.98	22.2	3.17	1.22	0.85	48.3
14	Bulk Density	1.5 g/cc	1.7 g/cc	1.8 g/cc	1.33g/cm <sup>3</sup>	1.26 g/cm <sup>3</sup>	1.33 g/cm <sup>3</sup>	1.33 g/cm <sup>3</sup>	1.29 g/cm <sup>3</sup>	1.5 g/cc
15	Water Holding Capacity	13.5%	40.6%	9.4%	26.11	1.28%	13.41%	1.21%	9.94%	15.5%

Sl. No	Test Parameters	Road No 2			Road No. 4					Road No. 5
		SQ1	SQ2	SQ3	SQ1	SQ2	SQ3	SQ4	SQ5	SQ1
16	Infiltration				9.8Cm/hr	13.1 Cm/hr	1.6 Cm/hr	5.1 Cm/hr	2.1 Cm/hr	
17	Cation Exchange Capacity	11.8 meq/100g	11.8 meq/100g	11.5 meq/100g	52.2 meq/100g	51.1 meq/100g	53.1 meq/100g	51.2 meq/100g	52.2 meq/100g	15.2 meq/100g
18	Cadmium	BDL(DL:2 mg/kg)	BDL(DL:2 mg/kg)	BDL(DL:2 mg/kg)	<2mg/kg	<2mg/kg	<2mg/kg	<2mg/kg	<2mg/kg	BDL(DL:2 mg/kg)
19	Chromium	BDL(DL:5 mg/kg)	BDL(DL:5 mg/kg)	BDL(DL:5 mg/kg)	1445.3 mg/kg	594.1 mg/kg	1005.4 mg/kg	197.9 mg/kg	768.9 mg/kg	11.8 mg/kg
20	Copper	22.9 mg/kg	22.4 mg/kg	25.4 mg/kg	65 mg/kg	37.2 mg/kg	38.9 mg/kg	30 mg/kg	36.3 mg/kg	35.3 mg/kg
21	Iron	1.42%	0.91%	1.14%	5244.1 mg/kg	584.5 mg/kg	1352.9 mg/kg	927.4 mg/kg	2896.0 mg/kg	2.17 mg/kg
22	Manganese	104 mg/kg	117.5 mg/kg	113 mg/kg	697.7 mg/kg	268.7 mg/kg	189.9 mg/kg	122.9 mg/kg	332 mg/kg	284%
23	Lead	BDL(DL:5 mg/kg)	7.2 mg/kg	BDL(DL:5 mg/kg)	8.1 mg/kg	6.76 mg/kg	4.7 mg/kg	5.9 mg/kg	5.0 mg/kg	BDL(DL:5 mg/kg)
24	Zinc	100.6 mg/kg	61.2 mg/kg	51 mg/kg	71.0 mg/kg	60.3 mg/kg	44.3 mg/kg	39.8 mg/kg	32.2 mg/kg	47.3 mg/kg
25	Nickel	41.1 mg/kg	21.9 mg/kg	27 mg/kg	54.2 mg/kg	33.2 mg/kg	69.6 mg/kg	19.9 mg/kg	37.7 mg/kg	66.8 mg/kg

Source: Baseline Environmental Monitoring done by Chennai Testing Labs, Chennai and Aqua Design, Chennai



#### 4.5.4. Land Use

The geographical area of Namakkal is only about 62% of that of Salem. The major land use of Namakkal district is agriculture (sown area) which consists of 51.63 % of total geographical area. forest (16.33 %) and current fallows (12.69 %) are the next major land uses in Namakkal

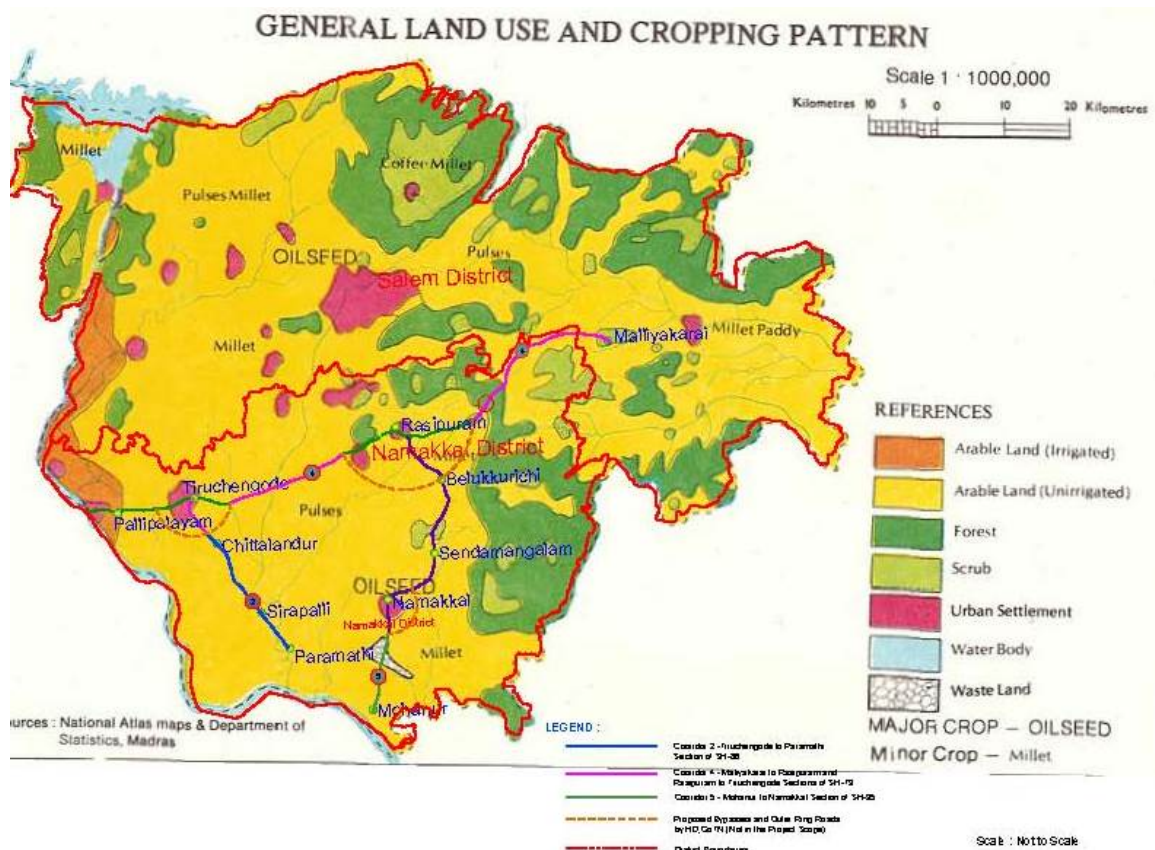
The major land use of Salem is agriculture land (sown area), which consist of 40 % of total area. The next major land uses are forestland (24.2 %) and current fallows (11.1 %).

The land use pattern in Salem and Namakkal districts is furnished in **Table 4.15**

**Table 4.15. Comparison of Land Use Types in Project Districts**

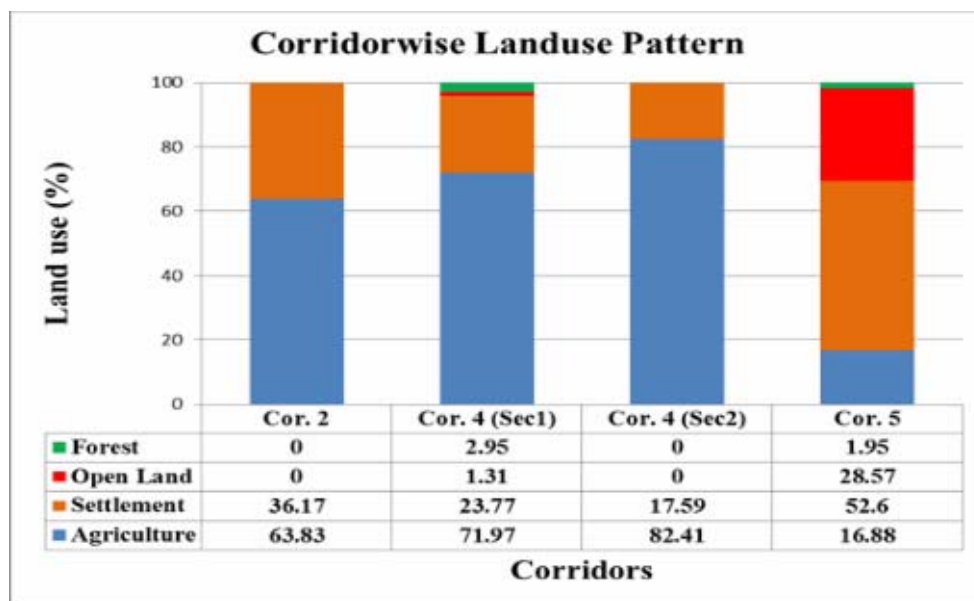
Sl. No.	Classification	Area in ha (% of total area)	
		Namakkal	Salem
1	Forest Land	52717 (16.33 %)	125682 (24.2 %)
2	Barren and uncultivable lands	13475 (4.17 %)	38894 (7.5 %)
3	Land put to non-agricultural uses	28709 (8.89 %)	60972 (11.5 %)
4	Cultivable Waste	7815 (2.42 %)	4947 (1.0 %)
5	Permanent pastures and other grazing lands	2487 (0.77 %)	4200 (0.8 %)
6	Land under misc. tree crops and groves	2248 (0.69 %)	2936 (0.6 %)
7	Current fallows	40962 (12.69 %)	57824 (11.1 %)
8	Other fallow lands	7646 (2.36 %)	16949 (3.3 %)
9	Net area sown	166577 (51.63 %)	208126 (40.0 %)
10	Total geographical area	322636 (100 %)	520530 (100 %)

Source: <http://advanceagripractice.in/location/>



**Figure 4.10. Map Showing Landuse Patterns in Project Districts**

Major land use along all the Phase-I roads under TNRSP-II is agricultural land. Land use pattern for Tiruchengode to Paramathy Section of Road No. 2 includes agriculture (63.83%) and settlement (36.17%). For Road No.4, in Section I - Malliyakarai to Rasipuram, the land cover includes mixed land use dominated by agriculture (71.97%), followed by settlements (23.97%), Forest areas (2.95%) and open area (1.31 %) and in Section II - Rasipuram to Tiruchengode, consists of agriculture (82.41) and settlement (17.59). Mohanur to Namakkal section of Road No.5 is dominated by settlement (52.60 %) followed by open land (28.57 %), agricultural land (16.88 %) and forest land (1.95 %). Map of the project area showing general land use and cropping pattern is presented in **Figure 4.11**.



**Figure 4.11. Comparison of Landuse Patterns in Phase-I roads under TNRSP-II**

**Occupational profile and sources of employment:** The reconnaissance survey shows that, most of the affected/benefited families are running business and others are agriculturalists. Major occupation of people in the project area is agriculture. Poultry and manufacturing sago products are other two major source of employment along the project corridors.

#### 4.5.5. Landslide / Landslip Problems

Major soil erosion, landslide or landslip problems are not reported from any part of the project area, since major parts of the project corridor are passing through plain terrain and also the rainfall of the project area is very less.

#### 4.5.6. Agriculture

The most prominent land use along the project road is agriculture (70%) and this area falls in agro-climatic zone of eastern and central dry zone.

The major field crops of Salem district are Sorghum, Maize, Paddy, Groundnut, Sugarcane and cotton. The major horticulture fruits are Tapioca, Mango, and banana and major vegetables are Tomato, Chilli and Brinjal. The major plantation crops of Salem are coffee and arecanut.

The principal cereal crops along the Phase-I roads under TNRSP-II are paddy, cholam, cumbu and ragi. Panivaragu, Kuthianally, Samai Varagu and Thinai are some of the millets cultivated. Among

pulses, the major crops are redgram, blackgram, greengram and horsegram. Among oil seeds groundnut, castor and gingerly (sesame) occupy important places. Of the commercial crops, sugarcane, cotton and tapioca are some of the important crops. Tapioca is used for the manufacture of sago.

A variety of fruits like mango, tamarind, guava & sapota and vegetables like tomato, brinjal, cabbage, chilies, etc. & flowers such as chrysanthemum, are cultivated along the project corridors.

## **4.6. Water Environment – Baseline**

### **4.6.1. Hydrology**

The Namakkal district is falling in part of east flowing Cauvery and Vellar river basins as per the Irrigation Atlas of India. Tirumanimuttar, Vasista and Sweta are the important minor basins.

Cauvery river, which is perennial in nature, flows along the western and southern boundaries of the Namakkal district. Tirumanimuttar river, has its origin in Manjavadi area of Shevroy hills in Salem district and confluence with Cauvery at Nanjai Edayar village of Paramathi taluk. A small area in the northeastern part, which is drained mainly by Vasista Nadi and Sweta Nadi rivers, which are tributaries of Vellar River.

The source of Irrigation is wells, canals and tanks. Well irrigation is the main source of irrigation covering 71272 ha. An area of 8868 ha is covered by Canal Irrigation. Other sources of irrigations like lift irrigation and odai are 6512 ha. There are nearly eighty thousand wells and eight thousand bore wells in Namakkal district. Among the taluks, Namakkal taluk seems to have exploited most of the ground water potential compared to the other three taluks and the net area irrigated is also the highest in this taluk. Canals are lined canals running across its territories and the total canal length is about 75km.

There are four canals ie, Mettur canal, Raja Vaikkal, Mohanur Vaikkal and Kumarapalayam. The four canals pass through three taluks and four blocks. Among the canal ayacut area, the area covered by the Mettur canal is the largest and Mohanur Vaikal is the smallest.

Salem district is drained by tributaries of Cauvery and Vellar rivers. Cauvery river, which is perennial in nature, flows along the western and southern boundaries of the district. Sarabanga and Tirumanimuttar are important tributaries of Cauvery river and originate in the Shevroy hills. The Swetha and Vasishta rivers are tributaries of Vellar river. The Swetha river originates in the Kollimalai and flows eastwards and joins the Vellar river. The Vasishta river originates in the chitteri hills and flows southwards and joins the Vellar river. In general, the district is characterized by dentritic drainage.

Major source of water for irrigation in Salem district is Cauvery River, which supplies water for 0.15 ha of agricultural land. Salem district is not endowed with any major irrigation system except Mettur Dam which irrigates about 0.15 lakh hectares through the West Bank canal of the Cauvery. Wells are the main source of irrigation in Salem district which constitutes about 97 percent of the total area under irrigation; both net and gross irrigated area. The irrigation intensity is 82 percent.

Phase-I roads under TNRSP-II passes through rivers, canals and streams, and abuts a number of lakes, ponds and bore wells, open wells and water taps. Corridor wise list of water bodies abutting/crossing project roads are presented in **Table 4.16**.

**Table 4.16. Details of Water Bodies along the Phase-I roads under TNRSP-II**

Sl. No	Name of the Water Body	Position w.r.to Road	Existing Chainage in Km	Distance from Ex. CL	Crossing / Abutting
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>					
1	Pond	RHS	55+400	8 m	Abutting
2	Pond	LHS	58+560	10 m	Abutting
3	Pond	LHS	68+420	13 m	Abutting
4	Canal	-	70+200	-	Crossing
5	Thirumanimuthar River	LHS	79+000	50 m	Abutting
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>					
1	Canal	LHS	0+400 to 0+800	8 m	Abutting
2	Pond	LHS	2+000	12 m	Abutting
3	Canal	-	2+080	-	Crossing
4	Canal	-	2+400	-	Crossing
5	Canal	-	4+340	-	Crossing
6	Canal	-	6+000	-	Crossing
7	Canal	-	6+120	-	Crossing
8	Canal	-	7+100	-	Crossing
9	Canal	-	10+400	-	Crossing
10	Canal	-	14+400	-	Crossing
11	Canal	RHS	18+350	15 m	Abutting
12	Canal	LHS	19+600 to 19+900	21 m	Abutting
13	Canal	-	24+450	-	Crossing
14	Canal	-	28+500	-	Crossing
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>					
1	Thirumanimuthar River	-	61+400	-	Crossing
2	Canal	-	69+800	-	Crossing
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>					
1	Canal	LHS	2+400	12	Abutting
2	Canal	LHS	8+900 to 9+600	15	Abutting
3	Canal	LHS	13+000 to 13+100	15	Abutting

Source: Reconnaissance Survey done by CDM Smith

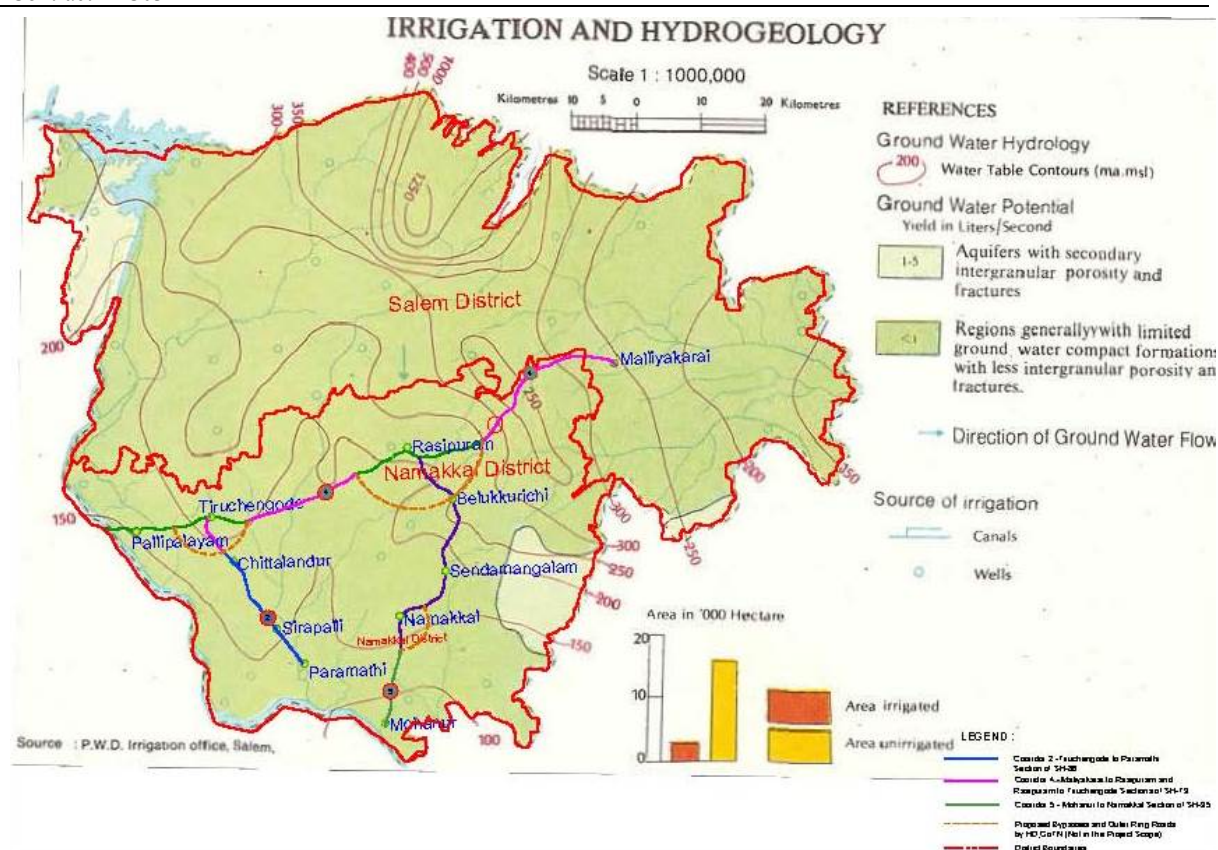


Figure 4.12. Map Showing Irrigation and Hydrogeology of the Project Area

#### 4.6.2. Drainage Conditions / Issues

In rural areas, the existing side drainage varies with terrain and road reserve width. On plain terrain, some sections have been constructed to generous reserve width and side drains are well-back from the road center line.

In urban and semi-urban areas, there is extensive use of concrete section of rectangular channel drains, either open or covered where vehicle or pedestrian access is required. In most cases there is no kerb and channel at the pavement edge and water runs off directly into the side drains. Alternatively, where kerb and channel is provided, water is led off to the side drains at intervals through kerb inlet and channel.

The most common drainage defects observed are:

- Absence of side drains and ponding of water at the road side – in both urban and rural areas;
- In some instances, there is inadequate width between neighboring property and the road edge to construct effective side drainage;
- Poor grading of the shoulder and side-slopes, allowing water to channel and scour along the road edge and to flow across the road instead of running off into the side drains;
- In urban areas, blocked or broken drainage channels and various obstructions to run-off.

### 4.6.3. Surface and Ground Water Quality

No detailed secondary data available to assess the water quality of the surface water bodies. From the visual observation, water quality of the lakes and ponds are seems to be below standard, as these water bodies are polluted by draining of sewage from nearby settlements and unscientific dumping of solid waste.

Ground water in Namakkal district is in general colourless, odorless, and predominantly alkaline in nature. A study conducted by Central Ground Water Board indicates that only some place of the district, the ground water is suitable for drinking and domestic uses. Excess of fluoride is observed in many places such as Venandur, Udaiyarpalayam, Talamabadi, V.G.Patti and Mohanur. The study by CGWB reveals that the ground water of Namakkal has higher than permissible levels of Ca CO<sub>3</sub>, NO<sub>3</sub>, and F.

In Salem district, the studies conducted by CGWB indicate that ground water is in general colourless, odorless and slightly alkaline in nature. However, it is observed that ground water is characterized by higher concentration of NO<sub>3</sub>, SO<sub>4</sub>, and F than the BIS permissible limit.

The project roads are passing through Attur block of Salem district and Elachipalayam, Kabilar malai, Malla Samundaram, Mohannur, Namagiripettai, Namakkal, Paramathy, Puchudhitram, Rasipuram and Tiruchengode blocks of Namakkal district. The ground water development status of these blocks and the districts in whole are given in the **Table 4.17**.

**Table 4.17. Stage of Ground Water Development in Project Areas as on March 2004 (in Ham)**

District / Block	Net Ground Water Availability	Existing gross draft for Irrigation	Existing gross draft for industrial and domestic water supply	Existing gross draft for all uses	Stage of Ground Water Development
<b>Salem</b>					
Attur Taluk	7543.47	14523.12	173.52	14696.64	195
<b>Salem District</b>	<b>85512.91</b>	<b>122959.45</b>	<b>3866.17</b>	<b>126825.62</b>	<b>148</b>
<b>Namakkal</b>					
Elachipalayam	2032.64	510.11	143.19	653.30	32
Kabilar malai	6091.86	4804.02	172.77	4976.79	82
Malla Samundram	1788.35	1637.01	127.99	1765.00	99
Mohanur	4776.78	3598.63	183.81	3782.44	79
Namagiripettai	4490.32	6712.28	201.03	6913.31	154
Namakkal	2258.51	2176.82	171.77	2348.59	104
Paramathij	5722.13	5136.98	156.48	5293.47	93
Puduchatram	2038.64	2278.74	154.94	2433.69	119
Rasipuram	1729.93	3077.25	134.35	3211.60	186
Tiruchengode	2943.24	2362.77	150.57	2513.34	85
<b>Namakkal District</b>	<b>49351.15</b>	<b>49069.81</b>	<b>2361.24</b>	<b>51431.05</b>	<b>104</b>

Source: District Ground Water Brochure for Namakkal and Salem districts, Central Ground Water Board

The baseline status of surface and ground water quality along the project roads has been established through sampling and analysis of various water quality parameters as part of the baseline environmental monitoring conducted by the Consultants. The sampling locations were selected at

representative locations based on existing land use and type of water body. The details of the same are presented in **Table 4.18**. Sampling for water quality monitoring was conducted at all the locations once during February 2014. The surface water samples were collected and analysed as per the procedures specified in IS: 2296 and ground water samples were analysed as per the procedures specified in IS: 10500.

**Table 4.18. Details of Water Quality Monitoring Locations**

Sl. No.	Name of the Location	Monitoring Locations & Environmental Setting
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>		
GW1	Meenkinar	From bore well at Km 57+200, irrigated cultivated land
GW2	Chitalandur	From bore well at Km 59+800, near residential area
GW3	Kandampalayam	From open well at Km 65+400, medium settlement with commercial activities.
GW4	Thottiyamthotam	From open well at Km 69+400, agricultural area
GW5	Mavureddy	From bore well near the Siva Temple at Km 79+600, an agriculture area.
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>		
GW1	Malliyakarai	From bore well at Km 0+200, rural settlement
GW2	Thimmanayakanapatti	From open well at Km 8+100, minor settlement
GW3	Mangalapuram	From open well at Km 14+600, medium settlement
GW4	Near Bailnadu RF	From bore well at Km 24+450, rural settlement
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>		
GW5	Ponkurichi	From open well at Km 51+400, agricultural land
GW6	Vaiyappamalai	From open well at Km 54+600, near rural settlement
GW7	Elachipalayam	From bore well at Km 62+500, commercial area
GW8	Mettupalayam	From bore well at Km 71+000, rural settlement
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>		
SW1	Mohanur	From Cauvery River near Mohanur, proximity to the starting location
GW1	Aniyapuram	From bore well at Km 10+800, rural settlement, Saravumalai RF is proximity to the location

Note: GW = Ground Water, SW = Surface Water

The prime objective of the baseline surface and ground water quality study was to establish the existing water quality of the study area to evaluate the anticipated impact of the proposed project and to suggest appropriate mitigation measures for implementation. This will also be useful for assessing the conformity to the standards of surface water quality during the construction and operation phase of the project.

The monitoring results for surface water quality and ground water quality are presented in **Table 4.19**.

**Table 4.19. Ground Water Quality Analysis Results for Tiruchengode to Paramathy Section of Road No. 2 (SH 86)**

Sl. No	Parameter	Unit	Values					As Per IS 10500-2012
			GW1	GW2	GW3	GW4	GW5	
1	pH Value	-	8.2	8.1	7.3	8.3	8.0	6.5 to 8.5
2	Apparent Colour	Hazen	2	2	5	2	2	5
3	Temperature	°C	29.8	29.8	29.7	29.9	29.8	Not specified
4	Electrical Conductivity	mmhos/cm	1814	937	2140	4327	1297	Not Specified
5	Turbidity	NTU	<1	<1	<1	<1	<1	5 (10)
6	Total solid	mg/l	1088	562	1286	2596	778	Not specified
7	Suspended Solid	mg/l	<2	<2	2	<2	<2	Not Specified
8	Total Dissolved Solids	mg/l	1088	562	1284	2596	778	500 (2000)
9	Dissolved Oxygen	mg/l	7.7	7.5	4.8	7.3	7.2	Not specified
10	Biological Oxygen Demand	mg/l	<2	<2	3	<2	<2	Not specified
11	Chemical Oxygen Demand	mg/l	<4	<4	8	<4	<4	Not specified
12	Alkalinity as CaCO <sub>3</sub>	mg/l	462	256	736	170	340	200 (600)
13	Total Hardness (CaCO <sub>3</sub> )	mg/l	560	318	672	1216	244	300 (600)
14	Chlorides (as Cl)	mg/l	272	121	373	1032	137	250 (1000)
15	Fluoride (as F)	mg/l	2.4	0.4	2.6	1.0	0.08	1.0 (1.5)
16	Sodium (as Na)	mg/l	150	92	152	650	117	Not Specified
17	Potassium (as K)	mg/l	27	12.0	54	9.0	92	Not Specified
18	Calcium (as Ca)	mg/l	87	72	138	216	46	75 (200)
19	Magnesium (as Mg)	mg/l	84	34	80	164	31	30 (100)
20	Sulphate (as SO <sub>4</sub> )	mg/l	148	58	15	292	77	200 (400)
21	Nitrates (as NO <sub>3</sub> )	mg/l	18	11	3.5	123	51	45
22	Nitrites	mg/l	BDL(DL:0.01)	0.02	43	0.7	BDL(DL:0.01)	Not Specified
23	Total Nitrogen, N	mg/l	20.2	14	48.3	125.4	53.4	Not Specified
24	Phosphate	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	0.1	BDL(DL:0.1)	0.09	Not Specified
25	Iron (as Fe)	mg/l	0.03	0.05	0.4	BDL(DL:0.01)	BDL(DL:0.01)	0.3 (1.0)
26	Mercury as (Hg)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	0.001
27	Zinc as (Zn)	mg/l	0.6	0.14	BDL(DL:0.08)	0.24	0.53	5 (15)
28	Copper as(Cu)	mg/l	0.03	BDL(DL:0.02)	BDL(DL:0.02)	BDL(DL:0.02)	BDL(DL:0.02)	0.05 (1.5)
29	Nickel as Ni	mg/l	0.03	0.02	0.04	0.05	0.02	0.05



Sl. No	Parameter	Unit	Values					As Per IS 10500-2012
			GW1	GW2	GW3	GW4	GW5	
30	Cadmium as (Cd)	mg/l	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	BDL(DL:0.002)	0.01
31	Chromium as (Cr)	mg/l	BDL(DL:0.001)	BDL(DL:0.01)	BDL(DL:0.01)	0.03	BDL(DL:0.01)	0.05
32	Manganese as (Mn)	mg/l	0.05	BDL(DL:0.01)	3.88	0.02	BDL(DL:0.01)	0.1 (0.3)
33	Lead as (Pb)	mg/l	0.02	BDL(DL:0.005)	0.02	BDL(DL:0.005)	0.02	0.05
34	Oil and Grease	mg/l	<2	<2	<2	<2	<2	Not specified
35	Phenolic Compounds	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	0.001
36	Total Coliform	MPN/100 ml	<2*	<2*	<2*	<2*	<2*	10
37	Faecal Coliform	MPN/100 ml	<2*	<2*	<2*	<2*	<2*	Absent

Source: Baseline Environmental Monitoring done by Chennai Testing Labs, Chennai

**Table 4.20. Ground Water Quality Analysis Results for Malliyakarai to Rasipuram & Rasipuram to Tiruchengode Sections of Road No.4. (SH 79)**

Sl. No	Parameter	Unit	Values				As Per IS 10500-2012
			GW1	GW2	GW3	GW4	
1	pH Value	-	7.73	7.07	7.18	7.18	6.5 to 8.5
2	Apparent Colour	Hazen	<2	<2	<2	<2	5
3	Temperature	°C	32	26	30	27	Not specified
4	Electrical Conductivity	mmhos/ cm	2180	1290	2500	2240	Not Specified
5	Turbidity	NTU	<0.1	<0.1	<0.1	<0.1	5 (10)
6	Total solid	mg/l	1402	822	1616	1440	Not specified
7	Suspended Solid	mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	Not Specified
8	Total Dissolved Solids	mg/l	1402	822	1616	1440	500 (2000)
9	Dissolved Oxygen	mg/l	5.8	5.4	6.2	6.0	Not specified
10	Biological Oxygen Demand	mg/l	BDL(D.L:4.0)	BDL(D.L:4.0)	BDL(D.L:4.0)	BDL(D.L:4.0)	Not specified
11	Chemical Oxygen Demand	mg/l	BDL(D.L:2.0)	BDL(D.L:2.0)	BDL(D.L:2.0)	BDL(D.L:2.0)	Not specified
12	Alkalinity as CaCO <sub>3</sub>	mg/l	300.6	433.9	519.8	476.8	200 (600)
13	Total Hardness (CaCO <sub>3</sub> )	mg/l	860	400	1020	810	300 (600)
14	Chlorides (as Cl)	mg/l	374.1	130.1	385.7	289.2	250 (1000)
15	Fluoride (as F)	mg/l	1.07	BDL(D.L:0.1)	0.94	0.73	1.0 (1.5)
16	Sodium (as Na)	mg/l	112.1	56.4	189.7	90.5	Not Specified
17	Potassium (as K)	mg/l	2.82	10.8	9.20	9.94	Not Specified

Sl. No	Parameter	Unit	Values				As Per IS 10500-2012
			GW1	GW2	GW3	GW4	
18	Calcium (as Ca)	mg/l	192	65.6	188	128	75 (200)
19	Magnesium (as Mg)	mg/l	92.4	57.4	133.7	119.2	30 (100)
20	Sulphate (as SO <sub>4</sub> )	mg/l	146.4	80.3	118.4	128.5	200 (400)
21	Nitrates (as NO <sub>3</sub> )	mg/l	50.5	5.8	4.25	4.16	45
22	Nitrites	mg/l	BDL(D.L:0.2)	BDL(D.L:0.2)	BDL(D.L:0.2)	BDL(D.L:0.2)	Not Specified
23	Total Nitrogen, N	mg/l	11.36	1.31	0.95	0.93	Not Specified
24	Phosphate	mg/l	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	1.53	Not Specified
25	Phenol	mg/l	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	0.001
26	Iron (as Fe)	mg/l	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	0.3 (1.0)
27	Mercury as (Hg)	mg/l	BDL(D.L:0.001)	BDL(D.L:0.001)	BDL(D.L:0.001)	BDL(D.L:0.001)	0.001
28	Zinc as (Zn)	mg/l	0.025	BDL(D.L:0.02)	0.05	BDL(D.L:0.02)	5 (15)
29	Copper as(Cu)	mg/l	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	0.05 (1.5)
30	Nickel as Ni	mg/l	BDL(D.L:0.02)	BDL(D.L:0.02)	BDL(D.L:0.02)	BDL(D.L:0.02)	0.05
31	Cadmium as (Cd)	mg/l	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	0.01
32	Chromium as (Cr)	mg/l	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	0.099	0.05
33	Manganese as (Mn)	mg/l	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	BDL(D.L:0.05)	0.1 (0.3)
34	Lead as (Pb)	mg/l	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	BDL(D.L:0.01)	0.05
35	Oil and Grease	mg/l	BDL(D.L:10)	BDL(D.L:10)	BDL(D.L:10)	BDL(D.L:10)	Not specified
36	Total Coliform	MPN/100 ml	5.5	2	1.8	<2*	10
37	Faecal Coliform	MPN/100 ml	3.7	2	1.8	<2*	Absent

Source: Baseline Environmental Monitoring done by Aqua Design, Chennai

**Table 4.21. Ground Water Quality Analysis Results for Malliyakarai to Rasipuram & Rasipuram to Tiruchengode Sections of Road No.4. (SH 79) – Contd.**

Sl. No	Parameter	Unit	Values				As Per IS 10500-2012
			GW5	GW6	GW7	GW8	
1	pH Value	-	7.61	7.12	7.50	8.16	6.5 to 8.5
2	Apparent Colour	Hazen	4	<2	<2	<2	5
3	Temperature	°C	24	27	27	24	Not specified
4	Electrical Conductivity	mmhos/cm	2440	4010	5910	3490	Not Specified
5	Turbidity	NTU	<0.1	<0.1	<0.1	<0.1	5 (10)
6	Total solid	mg/l	1564	2600	3828	2252	Not specified
7	Suspended Solid	mg/l	6.0	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	Not Specified

Sl. No	Parameter	Unit	Values				As Per IS 10500-2012
			GW5	GW6	GW7	GW8	
8	Total Dissolved Solids	mg/l	1570	2600	3828	2252	500 (2000)
9	Dissolved Oxygen	mg/l	5.4	5.7	5.2	4.8	Not specified
10	Biological Oxygen Demand	mg/l	BDL(DL:4.0)	BDL(DL:4.0)	BDL(DL:4.0)	BDL(DL:4.0)	Not specified
11	Chemical Oxygen Demand	mg/l	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	Not specified
12	Alkalinity as CaCO <sub>3</sub>	mg/l	253.1	137.8	140.1	409.1	200 (600)
13	Total Hardness (CaCO <sub>3</sub> )	mg/l	650	1240	1080	670	300 (600)
14	Chlorides (as Cl)	mg/l	351.9	361.6	1214.9	699.07	250 (1000)
15	Fluoride (as F)	mg/l	1.23	1.22	1.50	1.45	1.0 (1.5)
16	Sodium (as Na)	mg/l	318.3	316.9	696.6	639.3	Not Specified
17	Potassium (as K)	mg/l	19.5	2.52	25.7	35.44	Not Specified
18	Calcium (as Ca)	mg/l	152	300	128.0	160	75 (200)
19	Magnesium (as Mg)	mg/l	65.5	119.17	184.8	65.5	30 (100)
20	Sulphate (as SO <sub>4</sub> )	mg/l	191.3	142.8	327.4	237.8	200 (400)
21	Nitrates (as NO <sub>3</sub> )	mg/l	99.2	69.94	42.4	45.2	45
22	Nitrites	mg/l	BDL(DL:0.2)	BDL(DL:0.2)	BDL(DL:0.2)	BDL(DL:0.2)	Not Specified
23	Total Nitrogen, N	mg/l	22.3	15.7	9.5	10	Not Specified
24	Phosphate	mg/l	BDL(DL:0.05)	0.28	BDL(DL:0.05)	0.194	Not Specified
25	Phenol	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	0.001
26	Iron (as Fe)	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	0.3 (1.0)
27	Mercury as (Hg)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	BDL(DL:0.001)	0.001
28	Zinc as (Zn)	mg/l	0.7	BDL(DL:0.02)	0.04	0.595	5 (15)
29	Copper as (Cu)	mg/l	0.06	BDL(DL:0.05)	0.07	0.061	0.05 (1.5)
30	Nickel as Ni	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	BDL(DL:0.02)	BDL(DL:0.02)	0.05
31	Cadmium as (Cd)	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	0.01
32	Chromium as (Cr)	mg/l	0.099	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)	0.05
33	Manganese as (Mn)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)	BDL(DL:0.05)	0.1 (0.3)
34	Lead as (Pb)	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	BDL(DL:0.01)	0.05
35	Oil and Grease	mg/l	BDL(DL:10)	BDL(DL:10)	BDL(DL:10)	BDL(DL:10)	Not specified
36	Total Coliform	MPN/100ml	4	<2*	<2*	1.8	10
37	Faecal Coliform	MPN/100ml	2	<2*	<2*	1.8	Absent

Source: Baseline Environmental Monitoring done by Aqua Design, Chennai

**Table 4.22. Water Quality Analysis Results for Mohanur to Namakkal Section of Road No.5 (SH 95)**

Sl. No	Parameter	Unit	Values		As Per IS 2296-1982	As Per IS 10500-2012
			SW1	GW1		
1	pH Value	-	8.3	8.2	6.5 – 8.5	6.5 to 8.5
2	Apparent Colour	Hazen	5	2	300	5
3	Temperature	°C	29.5	29.8	Not specified	Not specified
4	Electrical Conductivity	mmhos/cm	630	977	Not specified	Not Specified
5	Turbidity	NTU	<1	<1	Not specified	5 (10)
6	Total solid	mg/l	378	586	Not specified	Not specified
7	Suspended Solid	mg/l	<2	<2	Not specified	Not Specified
8	Total Dissolved Solids	mg/l	378	586	1500	500 (2000)
9	Dissolved Oxygen	mg/l	6.9	7.4	4 (Minimum)	Not specified
10	Biological Oxygen Demand	mg/l	<2	<2	3	Not specified
11	Chemical Oxygen Demand	mg/l	<4	<4	Not specified	Not specified
12	Alkalinity as CaCO <sub>3</sub>	mg/l	201	332	Not specified	200 (600)
13	Total Hardness (CaCO <sub>3</sub> )	mg/l	172	400	Not specified	300 (600)
14	Chlorides (as Cl)	mg/l	63	93	600	250 (1000)
15	Fluoride (as F)	mg/l	0.8	BDL (DL:0.1)	1.5	1.0 (1.5)
16	Sodium (as Na)	mg/l	52	80	Not specified	Not Specified
17	Potassium (as K)	mg/l	6.0	5.0	Not specified	Not Specified
18	Calcium (as Ca)	mg/l	38	61	Not specified	75 (200)
19	Magnesium (as Mg)	mg/l	18	60	Not specified	30 (100)
20	Sulphate (as SO <sub>4</sub> )	mg/l	32	77	400	200 (400)
21	Nitrates (as NO <sub>3</sub> )	mg/l	BDL (DL:0.1)	1.7	50	45
22	Nitrites	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	Not specified	Not Specified
23	Total Nitrogen, N	mg/l	33.1	2.9	Not specified	Not Specified
24	Phosphate	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	Not specified	Not Specified
25	Iron (as Fe)	mg/l	0.05	BDL (DL:0.01)	50	0.3 (1.0)

Sl. No	Parameter	Unit	Values		As Per IS 2296-1982	As Per IS 10500-2012
			SW1	GW1		
26	Mercury as (Hg)	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	Not specified	0.001
27	Zinc as (Zn)	mg/l	0.1	BDL (DL:0.08)	15	5 (15)
28	Copper as (Cu)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	1.5	0.05 (1.5)
29	Nickel as Ni	mg/l	0.01	0.02	Not specified	0.05
30	Cadmium as (Cd)	mg/l	BDL (DL:0.002)	BDL (DL:0.002)	0.01	0.01
31	Chromium as (Cr)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	0.05	0.05
32	Manganese as (Mn)	mg/l	0.05	BDL (DL:0.01)	Not specified	0.1 (0.3)
33	Lead as (Pb)	mg/l	0.02	0.02	0.1	0.05
34	Oil and Grease	mg/l	<2	<2	10	Not specified
35	Phenolic Compounds	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	0.005	0.001
36	Total Coliform	MPN/100ml	<2*	<2*	5000	10
37	Faecal Coliform	MPN/100ml	<2*	<2*	Not specified	Absent

Note: \* - Value of <2 can be considered as absent.

Source: Baseline Environmental Monitoring done by Chennai Testing Labs, Chennai

For Tiruchengode to Paramathy section of SH 86, monitoring results reveals that, ground water in the project region is slightly alkaline where pH value is varies from 7.3 to 8.3. TDS, total hardness (CaCO<sub>3</sub>), Chloride, Calcium, Magnesium and Nitrate values in Thottiyapalayam are exceeds the IS:10500 standard. Ground water parameters of remaining locations are falling within the permissible limits of IS: 10500 standard.

For Malliyakarai to Rasipuram and Rasipuram to Tiruchengode sections of SH 79, monitoring results reveals that, ground water in the project region is neutral in nature. For Total Hardness (CaCO<sub>3</sub>), except in GW2, remaining all samples exceeds the permissible limits of IS 10500. Magnesium is beyond the limits in GW3, GW4, GW6 & GW7 and Nitrates exceed the limit in GW1, GW5, GW6 and GW8. Total dissolved Hardness exceeds the IS:10500 standard in GW6, GW7 and GW8. Ground water parameters for remaining locations are falling within the permissible limits of IS:10500 standard.

For Mohanur to Namakkal section of SH 95, Monitoring results reveals that, Surface and Ground water parameters are falling within the permissible limits of IS:2296 & IS:10500 standard

#### 4.6.4. Coastal and Marine Resources

Salem and Namakkal districts are land-locked districts and away from coastal line. Hence, coastal and marine resources are not present in these districts.

## 4.7. Ambient Noise – Baseline

Noise from the vehicle body parts includes engine, inlet, exhaust, transmission, suspension, gearbox, cooling fan, during acceleration and chassis, etc. Vehicle condition is very important to the source of noise and extent. The rolling noise/frictional noise (noise from the tyre-roadway system) includes aerodynamic noise, noise from tyre-road interaction, brakes, etc. The noise level depends upon on the type and condition of tyres and pavement. At higher speed, these types of noise increase at same rate. At lower speeds in urban areas, where lower gears are used, noise from the vehicle body parts tends to be independent of vehicle speed whereas noise from the tyre-roadway system becomes less important. Driver behavior contributes to road noise by using vehicle's horns, sudden breaking on vehicle speed, depending on the road surface and whether the surface is wet or dry.

### 4.7.1. Ambient Noise Level

Noise in general is unwanted / undesired sound, which is composed of many frequency components of varying loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human to a complex sound made up of various frequencies at different loudness levels. The most common and universally accepted scale is the A weighted scale which is measured as dB (A). This is more suitable for the audible range of sound, 20 to 20,000 Hz. The scale has been designed to weigh various components of noise according to the response of a human ear. The impact of noise sources on surrounding community depends on:

- Characteristics of noise sources (instantaneous, intermittent or continuous in nature). It can be observed that steady noise is not as annoying as one, which is continuously varying in loudness;
- The time of day at which noise occurs, for example high noise levels at night in residential areas are not acceptable because of sleep disturbance; and
- The location of the noise source, with respect to noise sensitive land use, which determines the loudness and period of exposure.

The environmental impact of noise can have several effects varying from Noise Induced Hearing Loss (NIHL) to annoyance depending on loudness of noise. The assessment of noise is carried out considering various factors like potential damage to hearing, physiological responses, annoyance and general community responses.

It is possible to describe important features of noise for noise levels measured over 24 hours using statistical methods. These features of noise are the parameters used for describing the noise levels at a particular location. Standards for permissible noise levels at various zones are set based on these parameters. The notations used for various noise level parameters are described below.

- $L_{eq}$  - Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
- $L_{eq(1\text{ hr})}$  - The equivalent noise level for a specific one - hour period.
- $L_{eq(24\text{ hr})}$  - The equivalent noise level during a 24 hour period.
- $L_{day}$  - The equivalent noise level from 6:00 hours to 22.00 hours.

- $L_{night}$  - The equivalent noise level from 22:00 hours to 6.00 hours.
- $L_{dn}$  - It is similar to a 24 hr equivalent noise level except that during night time (10 pm to 6 am) a 10 dB(A) weighting penalty is added to the instantaneous sound level before computing the 24 hr average. This night-time penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the daytime.

Noise level monitoring were conducted at pre-selected locations based on the land use and presence of sensitive features. The objective of assessing baseline noise levels can be later used to assess the impact of the total noise generated by the proposed project activities. Noise level monitoring carried out continuously for 24 hours with one hour interval at each location during the study period, Hourly  $L_{eq}$  values were computed by the noise integrating sound level meter and statistical analysis was done for measured noise levels at the pre-selected locations in the study area.

Vehicular movement is the only source for noise pollution in the project corridors. Ambient noise level monitoring locations for project corridors are presented in **Table 4.23**.

**Table 4.23. Details of Ambient Noise Level Monitoring Locations**

Sl. No	Name of the Location	Monitoring Locations & Environmental Setting
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>		
1	Meenkinar	At Km 56+200 near to Alpha Institutions, main land use is agriculture and rural settlements
2	Peechipalayam	At Km 61+900 near to New VIB Matriculation School, residential area with medium traffic.
3	Kandampalayam	At Km 65+000 near to Govt. HSS, commercial center with heavy traffic
4	Kandampalayam	At Km 65+800, near to Govt. PHC, commercial center with heavy traffic
5	Mavureddy	At Km 79+000, Residential area proximity to Paramathy town with medium traffic.
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>		
1	Maliyakarai	At Km 0+200, near to District Primary Health Center, rural settlement with medium traffic.
2	Gopalapuram	At Km 4+500 near to PU School, minor Settlement
3	Thimmanayakanapatti	At Km 7+800, near to Government HSS, minor rural settlement
4	Eswaramurthypalayam	At Km 9+500, near to PU Elementary School, minor rural settlement
5	Mangalapuram	At Km 14+650, near to Govt. High School, minor rural settlement
6	Near Bailnadu RF	At Km 24+400 near to Reserve Forests, rural settlement with agricultural activities
7	Kumpakotta	At 28+000, near to Gov. High school, Kumpakotta, minor settlement
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>		
8	Ponkurichi	At Km 51+900, residential area with medium traffic
9	Vaiyappamalai	At Km 54+800, near to Govt. HSS, major settlement with

Sl. No	Name of the Location	Monitoring Locations & Environmental Setting
		heavy traffic
10	Vaiyappamalai	At Km 55+900, near Skanda School of Architecture, open land / agricultural land
11	Elachipalayam	At Km 62+700, near to Govt. HSS, major settlement.
12	Mettupalayam	At Km 71+000, near to Nursery School, rural settlement
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>		
1	Mohanur	At Km 0+600, near to Mohanur bus stand, major settlement with heavy traffic
2	Mohanur	At Km 1+600, near to Govt. Girls Higher Secondary School
3	Seemapalayam	At Km 2+800, near to PHC, rural settlement
4	Aniyapuram	At Km 10+020, near to Arumugham Udaiyar Govt. Higher Secondary School, rural settlement
5	Near Veterinary University	At Km 12+300 near to Tamil Nadu Veterinary & Animal Science University, surroundings are characterized by a number educational institutions

The Leq day and L<sub>eq</sub> night calculated for various locations in the project area are presented in **Table 4.24**. The values are compared with the standards prescribed by CPCB for various zones.

**Table 4.24. Ambient Noise Level Monitoring Results along the Project Roads**

Location	Category of Area / Zone	Noise level Values Leq dB(A)		Applicable CPCB Standard Leq dB(A)	
		Day	Night	Day	Night
<b>Tiruchengode to Paramathy Section of Road No.2 (SH 86)</b>					
Meenkinar	Silent	54.7	42.6	50	40
Peechipalayam	Silent	57.1	42.5	50	40
Kandampalayam (65+000)	Commercial	67.1	50.9	65	55
Kandampalayam(65+800)	Commercial	60.3	45.4	65	55
Mavureddy	Residential	54.8	43.1	55	45
<b>Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)</b>					
Malliyakarai	Silent	57.09	52.27	50	40
Gopalapuram	Residential	52.38	37.6	55	45
Thimmanayakanapatti	Silent	52.06	50	50	40
Eswaramurthypalayam	Silent	52.3	40.01	50	40
Mangalapuram	Silent	51.4	45.05	50	40
Near Bailnadu RF	Residential	53.61	47.51	55	45
Kumpakotta	Silent	52.33	44.9	50	40
<b>Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)</b>					
Ponkurichi	Residential	52	43	55	45
Vaiyappamalai HSS School	Commercial	54	46.5	65	55
Vaiyappamalai	Silent	50.41	50	50	40
Elachipalayam	Silent	57.50	47.2	50	40
Mettupalayam	Silent	50.6	48	50	40
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>					
Mohanur (0+650)	Commercial	64.0	42.6	65	55
Mohanur(1+600)	Silent	56.1	44.3	50	40
Seemapalayam (2+800)	Silent	52.3	42.9	50	40



Location	Category of Area / Zone	Noise level Values Leq dB(A)		Applicable CPCB Standard Leq dB(A)	
		Day	Night	Day	Night
Aniyapuram	Silent	60.9	42.4	50	40
Near Veterinary University	Silent	62.5	47.1	50	40

Source: Baseline Environmental Monitoring done by Chennai Testing Labs, Chennai and Aqua Design, Chennai

## 4.8. Flora and Fauna – Baseline

### 4.8.1. Protected Natural Habitats

There are no protected natural habitats present within 15 Km radius of any of the project roads.

### 4.8.2. Wildlife Habitats outside Protected Areas

Wild animals like monkeys, can be seen in the forest areas along the project roads. Among the birds, peacocks are common while jungle fowls are also sometimes seen. Among the mammals, mongooses are seen throughout the project area. However, no wildlife corridors are reported across the project roads.

### 4.8.3. Forest Area

Forest contributes to nearly 13% to the geographical area mainly by the Kolli hills and parts of the Western Ghats that cut across the Namakkal district. Land put to non-agricultural uses are the next highest (11%). The forest area in Namakkal district is about 10.78% as reported in Land Use statistics. Apart from Reserve Forests, Reserve Lands occupy 12.31% of the total forest land.

Malliyakarai to Rasipuram section of Road No.4 is abutting/ Reserved Forest (RF) land at two locations. Pudupatti East Beat RF on RHS (from Km 22+600 to Km 23+900) and Bailnadu RF on LHS (from Km 24+500 to Km 25+000) are abutting the road. Mohnur to Namakkal section of Road No.5 is abutting Saravumalai RF on LHS (from Km 10+700 to Km 11+000). There is no diversion of forest land due to this project. **Figure 4.13** and **Figure 4.14** show the location of reserved forests abutting the project alignments. As per the Champion and Seth's<sup>1</sup> (1968) classification of forests, the forests along the project roads are tropical dry deciduous forests.

<sup>1</sup> Champion H. G. and S. K. Seth. 1968. A Revised Survey of the Forest Types of India. Published by Govt. of India Press.

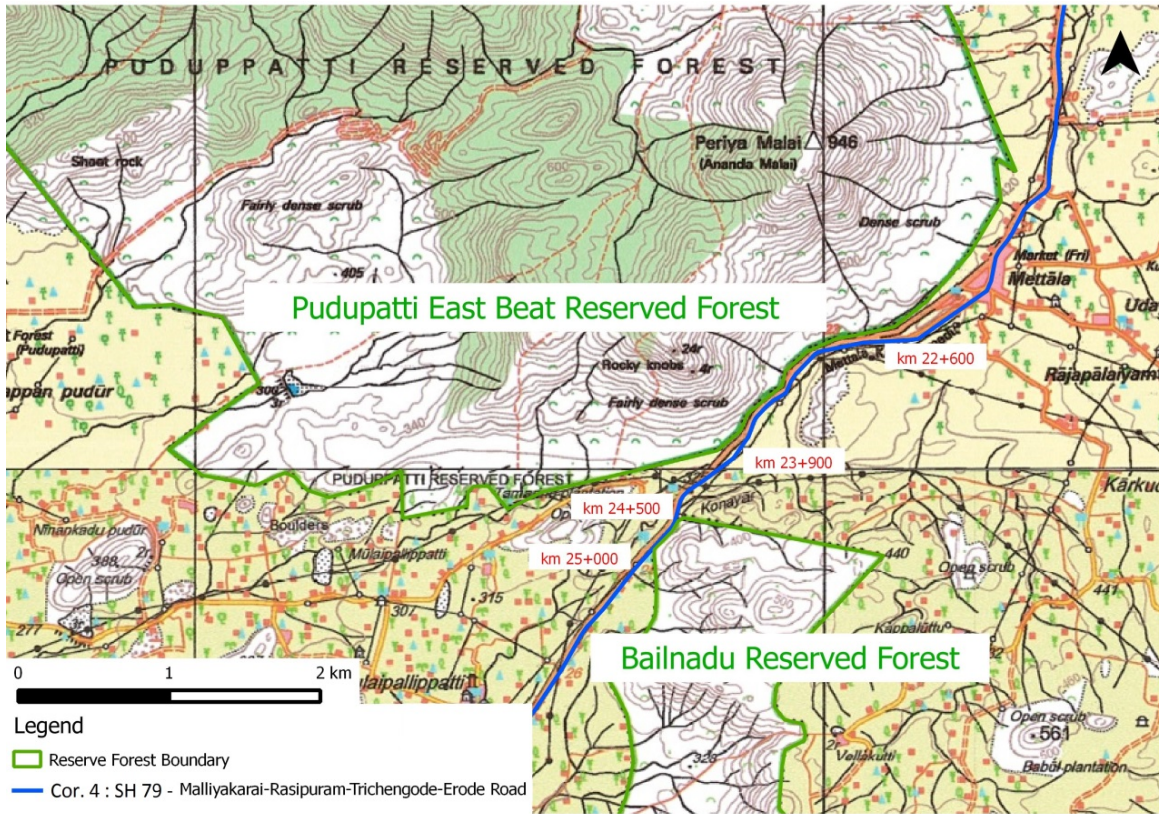


Figure 4.13. Map showing Reserved Forests along Malliyakarai – Rasipuram Road

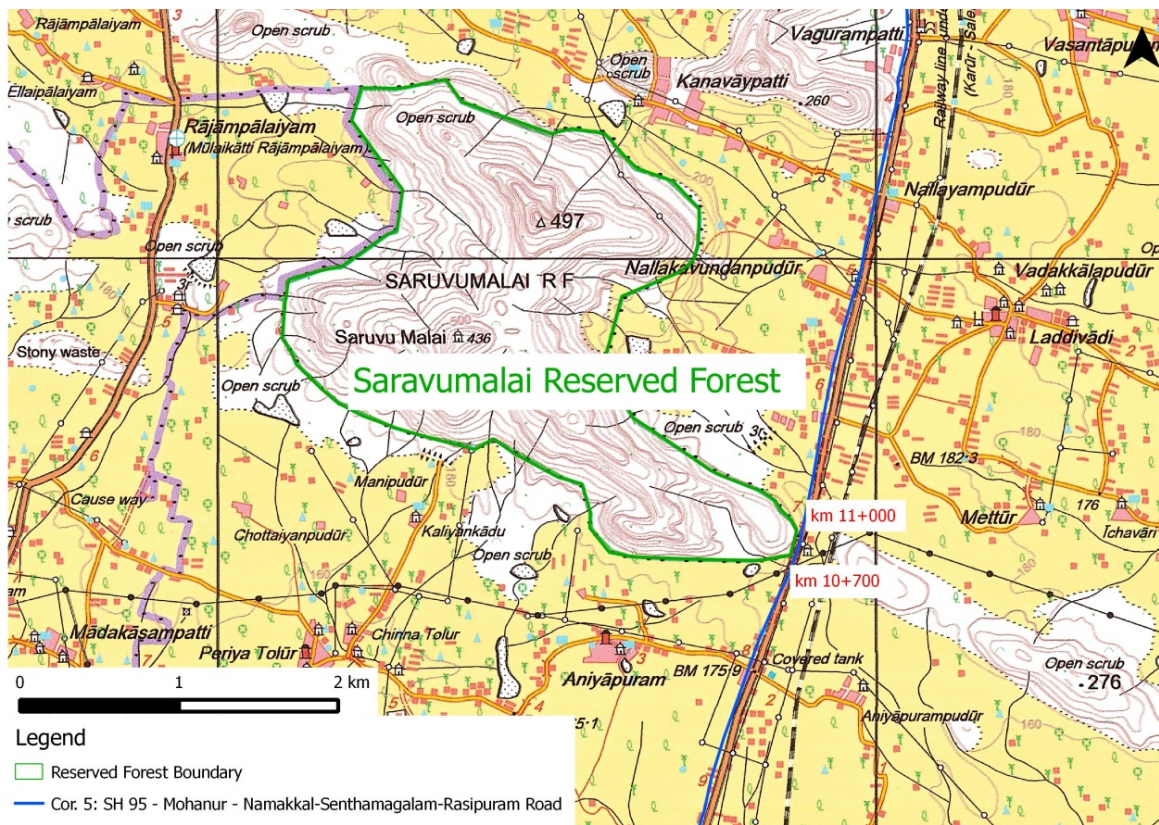


Figure 4.14. Map showing Reserved Forests along Mohanur – Namakkal Road

#### 4.8.4. Flora

List of dominant trees found along the project roads are given in **Annexure 4.1** with their RET status. The baseline study of flora has primarily taken into account the flora along the roadside, as the direct impact of the project is on the trees in the formation width. Chainage wise details of number of trees to be felled for the Phase-I roads under TNRSP-II are presented in **Annexure 4.2**.

##### 4.8.4.1. Green Tunnel

A well maintained avenue plantation on both sides of the Malliyakarai to Rasipuram section of Road No.4 (SH 79) and Mohanur to Namakkal Section of Road No.5 was observed during the reconnaissance survey. Tamarind tree species was found in majority of the avenue plantation. Especially in some stretches which forms a continuous canopy, giving the effect of Green Tunnel. In Malliyakarai - Rasipuram section of Road No. 4, green tunnel observed for a length of about 8.15 Km and in Mohanur to Namakkal Section of Road No. 5, it is observed for 3.00 Km. However, no green tunnel was observed in Tiruchengode - Paramathy section of Road No. 2. Chainage wise details of the green tunnel for the project corridors are given in **Table 4.25**.

**Table 4.25. Details of Green Tunnel along the Project Road**

Sl. No	From (Km)	To (Km)	Length in Km
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>			
1	2+600	3+400	0.800
2	3+400	4+000	0.600
3	5+200	5+200	0.000
4	10+400	12+000	1.600
5	12+550	13+600	1.050
6	14+600	15+400	0.800
7	15+500	16+200	0.700
8	16+600	18+200	1.600
9	18+800	19+100	0.300
10	19+200	19+900	0.700
<b>Total</b>			<b>8.150</b>
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>			
1	1+800	2+300	0.500
2	7+400	8+600	1.200
3	8+900	9+800	0.900
4	11+600	12+000	0.400
<b>Total</b>			<b>3.000</b>

Source: Reconnaissance Survey done by CDM Smith

#### 4.8.5. Fauna

**Annexure 4.1** gives the list of fauna found along the PIA with their IUCN status.

#### 4.8.6. Presence of Vulnerable, Threatened and/or Endangered Species of Flora and Fauna

Among the major flora species found in Salem district are *Crotolaria clavata* and *Crotolaria longipes* are endangered species and *Crotolaria digitata*, *Crotolaria scabra*, *Indigofera barberi* are rare species.

The rare species identified in Namakkal district are *Crotalaria digitata*, *crotalaria scabra* and *Indigofera barberi*; and the endangered species identified at Namakkal are *crotalaria Clavata*, *Crotalaria longipes*, *Hildegardia populifolia* and *Venonia shevaroyensis*.

## 4.9. Socio-Economic Environment

Salem is a major centre for Industries, Commerce, transportation, services like education, health, etc. Lorry, bus transport, drilling rigs, heavy earth moving equipment, LPG tankers, and container transport facilities prevailing in Salem city provides sizeable employment opportunities in transport and transport related industries. Sago-Starch product Industries, Silk weaving & cotton textile industries proliferate in the area. Silver smithy and gold smithy are carried out in thousands of cottage industries and the products are exported all over the country. Further, Salem is a major market for rice and dal.

Nationwide Namakkal is known for Body Building for Truck, Trailer, Tanker and Rig unit. Customers from other States also get the truck body building work done in Namakkal. Body building for trucks and Rig units are being exported to foreign countries from Namakkal. About 25000 persons got employment directly and indirectly in truck body building activity in Namakkal district. About 300 units in Namakkal and 100 units in Tiruchengode are engaged in this activity.

Namakkal district is also well known for poultry and dairy industries, accounting for a bulk of supply of poultry products to neighboring industries. In fact, Namakkal produces about 65% of the egg output of Tamil Nadu.

### 4.9.1. Demographic Profile

Demographic features of the Project districts such as total population, population density, sex ratio and literacy rate is presented in **Table 4.26**.

**Table 4.26. Demographic Profile of the Project Districts**

Particulars		Salem	Namakkal
Population	Persons	3480008	1721179
	Males	1780569	866740
	Females	1699439	854439
Sex Ratio (Female / 1000 Males)		954	986
Population density (per sq.Km.)		663	506
Literacy	Persons	2285562	1176131
	Males	1285107	653312
	Females	1000455	522819
Working Population	Persons	1694160	898245
	Males	1083797	531463
	Females	610363	366782
Child Population in the age group 0-6	Persons	344960	150699
	Males	180002	78754
	Females	164958	71945

Source: Census Survey of India, 2011

## 4.9.2. Settlements/Villages

Major settlements along the project corridors are Namagiripettai, Rasipuram, Tiruchengode, Mohanur and Namakkal. In these, Namagiripettai, Rasipuram, Tiruchengode and Namakkal are being bypassed under Rural Development Scheme, GoTN funded by NABARD. Hence, these towns were excluded from the scope of work. The important settlements along the project corridors are given in **Table 4.27**.

**Table 4.27. Important Settlements along the Project Corridors**

Name of the Corridor	Important Settlements along the Corridors
Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Meenkinaru, Pulliyampatti, Chittalandur, Maniyanur, Kandampalyam, Musalnaikenpalyam, Irumbupalyam, Vasanthapuram, Arthnaripalyam, Mavureddy and Paramathy
Malliyakarai to Rasipuram Road No. 4 (SH 79) – Section I	Malliyakarai, Gopalapuram, Thimmanayakanapatti, Eswaramurthipalayam, Mangalapuram, Ayilpatti, Mettala and Thaneerpanthalkadu
Rasipuram to Tiruchengode Road No. 4 (SH 79) – Section II	Ponkurichi, Kallupalayam, Vaiyappanmalai, Elachipalayam, Elimedu and Mettupalayam
Mohanur to Namakkal Section of Road No.5 (SH 95)	Mohanur, Pottampalayam, Rasipalayam, Naikarampatti, Pandiyanhar, Aniyapuram and Lathvadi

Source: Reconnaissance Survey done by CDM Smith

## 4.9.3. Socio-Cultural Resources

### 4.9.3.1. Religious Center

There are noticeable numbers of religious structures found along the project roads. Corridor wise details of the same are depicted in **Table 4.3**.

### 4.9.3.2. Cultural Heritage Sites

There are no cultural heritage sites along any of the project roads. Ardhanareeswara temple at Tiruchengode and Anjaneya Temple at Namakkal are the two cultural heritage sites coming within the 10 Km radius of the project corridors.

### 4.9.3.3. Archeological Monument

Hill fort at Namakkal, a listed monument of Archaeological Survey of India is coming within 10 Km radius of Corridor 5. Other than this, there is no archaeological monument along any of the TNRSP-II PPC03 Roads.

### 4.9.3.4. Presence of Sensitive Receptors

In addition to the built-up areas, there are a large number of educational institutions, libraries and hospitals are present along the project road. All these features are socially very sensitive and needs critical care in preserving them during widening. Location of these sensitive structures are listed in **Table 4.4**.

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# Chapter 5. Stakeholder Consultation

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## 5.1. Introduction

Consultative procedure since the inception of the project has been continued during pre-feasibility, feasibility, Environmental Assessment and Management Plan preparation stage considering the fact that involving local communities in the project planning is basis of the participatory planning. Because, often suggestion and option given by the people improves technical and economic efficiency of the project and suggested improvements proposal of the people generates sense of ownership within communities thus eases implementation process.

### 5.1.1. Definition of Stakeholders

Stakeholders are those who have a direct interest in the project development and whose participation needs to be ensured in consultation at various stages. Stakeholders include project affected people, project beneficiaries, elected representative of legislative assembly, parliament and local self-government bodies and officials of various government departments.

To ensure that stakeholder concerns are incorporated in the project design and to promote public understanding about the project and its implications. Public consultation and information dissemination is treated as a two way process where the information is passed on to public and their feedback is sought to understand their issues. The consultative process is continued throughout the project period – design preparation, implementation and post implementation periods. The preparatory stage consultation helps to explore alternative design options, to avoid very adverse social and environmental impacts and to reduce the magnitude of the impacts of the project by suggesting suitable measures, to identify the environmental hotspots for further enhancement, while consultation during implementation stage helps to facilitate a smooth resettlement of the PAFs thereby enabling speedy implementation of the project.

### 5.1.2. Stages of Consultation and Information Dissemination

The consultation process formulated for the project employed a range of formal and informal consultative methods including in-depth interviews with key informants, focus group discussions, meetings and workshops. The consultation programmes were scheduled at two stages of the project, which can be broadly classified as:

- Consultation before Project Design
- Consultation after Project Design

## 5.2. Consultation before Project Design

### 5.2.1. Identification of Stakeholder

For consultation and participation, primary and secondary stakeholders have been identified considering their expected roles in the planning and implementation of the project. Primary stakeholders are main stakeholders with whom the project has direct interaction.

Primary stakeholders will include Project Affected Persons (PAPs) and Households and Beneficiaries of the project, including representative of vulnerable households. Secondary stakeholders (other stakeholders) will include elected representatives, community leaders of PAPs, representative of CBOs, representative of local NGOs, and official of forest department, public works departments and various other government institutions.

### 5.2.2. Planning for Consultation

The consultation mechanism has been planned at each level of project preparation. While village level and block level consultation was planned during environmental assessment continue till operation stage, district level consultation, key informant interview and other focused consultative procedure was planned during detailed environmental impact assessment stage. One of the features of present consultation program is to have continued involvement of local engineers of HD and TNRSP in planning and preparation of environmental management framework for the implementation of project largely based on input from concerned stakeholders. The consultation strategies and phases have been discussed and presented in **Table 5.1**.

**Table 5.1. Planning and Present Status of Consultation**

Stakeholders	Level of Consultation	Start Stages	Future course
PAPs, community, Women groups, NGOs	Village	Before Project design	Started Contd.
HD Officials, TNRSP officials at Field,	PIU and Field Offices	Before Project design	First round completed, Contd.
Forest Official	Divisional and Range level	Before Project design	Ongoing
District Officials of line Department, such as Forest, SLAO	District	Before Project design	Continued
Pollution Control Board	State	Before Project design	Continued
District and State Forest Officials	State	Before Project design	Continued

### 5.2.3. Focus Group Discussion (FGD)

The overall goal of FGD programme at before project design is to disseminate project information and incorporate PAPs views in the road design and resettlement plan and also to document the existing environmental profile of the project influence area (PIA). The Focus Group Discussion (FGD) adopted for this project involved one time discussion of various topics related to the project such as environmental issues, loss of access and safety, and social issues. The one-time face-to-face meetings were structured to be informal to encourage open discussion among participants in a relaxed atmosphere and were a good way to gauge the opinions of the public. Individual opinion sheets were distributed to all participants at the time of discussion to convey their opinions and suggestions regarding this project and document existing baseline environmental profile.

### 5.2.4. Details of Focus Group Discussion (FGD) Conducted

In order to document the issues raised by PAPs, public interactions were conducted at nodal points of towns and villages during November and December of 2013. A large number of potentially affected

persons expressed their views about the proposed project. Details of location wise FGDs and issues for the Phase-I roads under TNRSP-II are presented in **Table 5.2**. Photographs of Focus Group Discussion are presented in **Annexure 5.1**.

**Table 5.2. Details of Location-wise Focus Group Discussion and Issues Discussed**

Sl No	Name of the Location	Subjects and Issues Discussed	Suggestion from the Participants
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>			
1	Palmadai	Objective of the project Existing Environmental Profile Existing Traffic Profile Accident rate along the stretch	Junction improvement should be provided Speed breaker is required to reduce the accident rate
2	Tiruchengode	Objective of the project Feasibility of Bypass Option Existing Environmental Profile Existing Traffic Profile	Bypass should be provided to avoid the present traffic congestion and R& R issues.
3	Kalliyappanur	Objective of the project Existing Environmental Profile Existing Traffic Profile Accident rate along the stretch	Road construction should be limited within the available land Compensation for land and structure should be given as per the market rate. Trees should be protected from the proposed improvement
4	Musalnaickenpalayam	Objective of the project Existing Environmental Profile Existing Traffic Profile Accident rate along the stretch	Proposed improvement should be limited and to be minimum impact to their land and their property
5	Vasanthapuram	Objective of the project Existing Environmental Profile Existing Traffic Profile Accident rate along the stretch	Proposed improvement should be limited and to be minimum impact to their land and their property
<b>Malliyakarai to Rasipuram and Rasipuram to Tiruchengode Sections of Road No.4. (SH 79)</b>			
1	Malliyakarai	Objective of the project Feasibility of Bypass Option Existing Environmental Profile Existing Traffic Profile	Road construction should be limited within the available land Compensation for land and structure should be given as per the market rate. No. of trees to be cut should be minimum
2	Thimmanayakanapatti	Objective of the project Feasibility of Bypass Option Existing Environmental Profile Existing Traffic Profile	Road construction should be limited within the available land



Sl No	Name of the Location	Subjects and Issues Discussed	Suggestion from the Participants
3	Eswaramurthypalayam	Objective of the project Existing Environmental Profile Existing Traffic Profile Presence of Wild Animals Presence of Rare Plants	Proposed improvement should be limited and to be minimum impact to their land and their property
4	Ayilpatti	Objective of the project Existing Environmental Profile Existing Traffic Profile Cultivation profile	Proposed improvement should be limited and to be minimum impact to their land and their property
5	Moolapallipatti	Objective of the project Existing Environmental Profile Existing Traffic Profile Presence of Wild Animals Presence of Rare Plants	Anjaneya Temple at Reserved Forest should be protected from the proposed improvement Speed breaker should be provided at the forest location to avoid the accidents to monkeys No. of trees to be cut should be minimum
6	Namagiripettai	Objective of the project Feasibility of Bypass Options Existing Environmental Profile Existing Traffic Profile	Bypass should be provided to avoid the present traffic congestion. Compensation for land and structure should be given as per the market rate
7	Rasipuram	Objective of the project Feasibility of Bypass Options Existing Environmental Profile Existing Traffic Profile	Bypass should be provided to avoid the present traffic congestion. Compensation for land and structure should be given as per the market rate
8	Pillanur	Objective of the project Feasibility of Bypass Options Existing Environmental Profile Existing Traffic Profile	Compensation for land and structure should be given as per the market rate Compensation for squatters also should be given
9	Vaiyappamalai	Objective of the project Existing Environmental Profile Existing Traffic Profile	Road construction should be limited within the available land Two junction at Vaiyappamalai should be improved as part of this project
7	Elachipalayam	Objective of the project	Improvement should be

Sl No	Name of the Location	Subjects and Issues Discussed	Suggestion from the Participants
		Existing Environmental Profile Existing Traffic Profile	limited to existing land available.
8	Tiruchengode	Objective of the project Feasibility of Bypass Option Existing Environmental Profile Existing Traffic Profile	Bypass should be provided to avoid the present traffic congestion and R& R issues.
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>			
1	Mohanur	Objective of the project Existing Environmental Profile Existing Traffic Profile	Proposed improvement should be limited and to be minimum impact to their land and their property Asked for the connectivity to the new Vangal – Mohanur bridge
2	Namakkal	Objective of the project Existing Environmental Profile Existing Traffic Profile Feasibility of bypass option	Bypass should be provided to avoid the present traffic congestion and R& R issues. Existing road improvement should be taken as part of the project

While analysing the opinion sheets collected from FGD, it became quite clear that the people who are staying and doing the business at major built-up locations are strongly demanding for bypass as developing the highway through the city which will disturb the residential, commercial and religious buildings. The PAFs demanded for market value for their losing assets and also asked to explore more options to minimise the negative impact. However public raised very few queries/suggestions on environmental components such as felling of tree should be minimum, Speed breaker should be provided at the forest location to avoid the accidents to monkeys etc.

## 5.2.5. Institutional Level Consultation

Institutional level consultation was conducted to collect their opinion about the project and to collect the secondary details of the study area. Details of various government officials and local body members consulted are presented in **Table 5.3**.

**Table 5.3. Details of Institutional Level Consultation**

Sl No	Name of the Person	Month of Consultation	Suggestion / Issues / Comments
1	Ms. Padmavathi, IFS, Divisional Forests Officer, Namakkal Mob: +91 9445468243	November 2013 & January 2014	<ul style="list-style-type: none"> <li>She informed that a large number of mature trees are present along the project corridors, therefore cutting of trees should be minimized during project.</li> <li>She also informed that some Reserve Forests are located near to the project corridors.</li> <li>To avoid the impacts on forests, she has</li> </ul>

Sl No	Name of the Person	Month of Consultation	Suggestion / Issues / Comments
			<p>suggested to improve the project road towards the non-forests land at these locations.</p> <ul style="list-style-type: none"> <li>It was informed, that other than reserve forests, there is no any ecologically sensitive areas within 10 Km buffer of the project roads.</li> <li>During this meeting, Consultants requested to stop planting new trees along the project corridors, until finalization of proposed improvement.</li> </ul>
2	Mr. Dileep IFS, Assistant Conservator of Forests, Rasipuram Mob: +91 7598422999	November 2013 & January 2014	<ul style="list-style-type: none"> <li>After making joint site inspection, Mr. Dileep clarified that two of our project roads are abutting three reserve forests and requires forest clearance if the improvement will take place in the forest area.</li> <li>During the meeting, profile of existing flora and fauna along the project area were discussed. It was informed that, no major wildlife present in the forests along in the project area.</li> <li>It was also confirmed, that there is no migratory route of wild animals in the project area.</li> </ul>
3	Mr. Kannaiyan, Forester, Pudupatti Mob: +91 9994710492	November 2013	<ul style="list-style-type: none"> <li>Mr. Kannaiyan clarified the exact location where the forest abuts the project roads.</li> <li>He confirmed that no migratory route of wild animals in the area, however Macaques and peacocks are observed in the forest area.</li> </ul>
4	Mr. Perumal, Forest Guard, Mayilnadu Mob: +91 9965052650	November 2013	<ul style="list-style-type: none"> <li>Mr. Perumal confirmed that no migratory route of wild animals in the area, however Macaques and peacocks are observed in the forest area.</li> </ul>
5	Mr. Virappan, Drafting Officer, Namakkal Forest Office	January 2014	<ul style="list-style-type: none"> <li>Mr. Virappan clarified the exact location where the forest abuts the project roads.</li> <li>He also showed the starting and ending locations of the forest areas</li> </ul>
6	Mr. Karkathiran, Range Forest officer, Namakkal	January, 2014	<ul style="list-style-type: none"> <li>Mr. Karkathiran showed the forest area abutting project road and confirmed that no migratory route of wild animals in the area.</li> </ul>
7	Mr. Sridhar Executive Engineer Oil and Ash Handling Division, Mettur Thermal Power Station, Mettur. Mob: +91 9445856773	March 2014	<ul style="list-style-type: none"> <li>Mr. Sridhar was consulted to obtain the details on quantity and rate of fly ash available with MTPS. He provided the said details vide Letter No. CE/SE/M.II/EE/O&amp;AHS/MTPS-I/F.Wet ash / D.300/2014, dated 22.04.14</li> </ul>
8	Ms. G. Sivagami Junior Engineer	March 2014	<ul style="list-style-type: none"> <li>Ms. Sivagami was consulted to obtain the surface water quality of Thirumanimitharu</li> </ul>

Sl No	Name of the Person	Month of Consultation	Suggestion / Issues / Comments
	Hydrology Division CWC, Chennai.		River at Elachipalayam and Paramathi and Cauvery River at Mettur, Bhavani, Erode, Musiri, Mukkombu, and Trichy. <ul style="list-style-type: none"> <li>It was informed that, the said data is not available.</li> </ul>
9	Mr. Palanichamy Panchayath President Kandapalayam Panchayath Mob:9585344433	March 2014	<ul style="list-style-type: none"> <li>Mr. Palanichami was consulted about the various issues especially about the project road is passing through his panchayat.</li> <li>He expressed his concern on land acquisition and building demolition through his panchayath and requested to avoid building present next to road in the village areas.</li> </ul>
10	Mr. Palanivel, Panchayat President, Eswaramurthypalayam Panchayat Mob: +91 9451395777	November 2013	<ul style="list-style-type: none"> <li>Mr. Palanivel was consulted about the various issues especially about the project road is passing through his panchayat.</li> <li>He also shared the concerns of persons those who are staying close to roads.</li> <li>He also asked to get the unskilled works to locals during construction period</li> </ul>
11	Mr. Ramaswami, Panchayat President, Ponkurichi Panchayat Mob: +91 9443029678	January 2014	<ul style="list-style-type: none"> <li>Mr. Ramaswami was consulted about the various issues especially about the project road is passing through his panchayat.</li> <li>He also shared the concerns of persons those who are staying close to roads.</li> </ul>
12	Mr. Jyothilingam Panchayath President Mangalapuram Panchayath Mob: 9626781792	March 2014	<ul style="list-style-type: none"> <li>Mr. Jyothilingam was consulted about the various issues especially about the project road is passing through his panchayat.</li> <li>He also shared the concerns of persons those who are staying close to roads.</li> </ul>
13	Mr. E.K Kaliyannan Panchayath President Vaiyappamalai Panchayath Mob: 9626781792	March 2014	<ul style="list-style-type: none"> <li>Mr. Kaliyannan was consulted about the various issues especially about the project road is passing through his panchayat.</li> <li>He expressed his concern on land acquisition and building demolition through his panchayath and requested to avoid building present next to road in the village areas.</li> <li>He also asked about proposed project improvement at curve section near Vaiyappamalai hill.</li> </ul>
14	Mr. Manivanam, Depot Manager, Agricultural Department, Maliyakarai Mob: +91 9543955134	December 2014	<ul style="list-style-type: none"> <li>Mr. Manivanam was consulted to get the agricultural profile of the project area</li> </ul>
15	Mr. Ramalingam, Revenue Officer, Rasipuram Taluk	December 2014	<ul style="list-style-type: none"> <li>Mr. Ramalingam was consulted to get the FMB sketches of project roads near the forest area.</li> </ul>

## **5.3. Consultation after Project Design**

After the design of the proposed improvements, consultation at individual level, in groups and structured public consultation meetings at selected locations were conducted. The consultation mechanism devised to ensure that people are consulted; their project related decision/opinions are gathered and agreement reached on their suggestion/preferences is shared with the community. For this purpose, the consultation mechanism was initiated with the information dissemination, followed by structured public consultation meetings.

### **5.3.1. Information Dissemination**

- While conducting inventory of environmental features along the project roads, the consultant has conducted information dissemination along the project route by one to one canvassing about proposed improvement.
- Potential project affected families were consulted to inform them about proposed road improvement program and possible environmental conflict such as tree cutting, relocation of utilities.

### **5.3.2. Structured Public Consultation Meetings**

Public Consultation refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. Local affected persons are the stakeholders (such as land owners, tenants) who are directly affected by the proposed project activities. Other concerned persons are local NGOs, officials of various government departments and local residents who are indirectly affected by project activities. The key informants during the public consultation included both individuals and groups namely:

- Heads and members of households likely to be affected
- Groups/clusters of PAPs
- Village Panchayats heads and members
- Local voluntary organizations, CBOs and NGOs
- Government agencies and departments such as local revenue authority, PHED, PWD, Forest, Horticulture, agriculture etc.
- Other project stakeholders with special focus on PAPs belonging to the vulnerable group.

For TNRSP-II PPC03 roads, section wise public consultation was conducted. Locations were selected at middle portion of the project stretch based on considering the better accessibility; well know place to public and prime village/town in the project region.

Structured Public consultation was conducted at Kandampalayam village for Tiruchengode to Paramathy Section of Road No. 2, at Mangalapuram for Malliyakarai to Rasipuram 4 section of Road No. 4 (Section I), at Vaiyappamalai for Rasipuram to Tiruchengode section of Road No. 4 (Section II) and at Mohanur for Mohanur to Namakkal Section of Road No. 5, to assess the perception of the people towards the project. Public Consultation photos and filled registration forms are presented in

**Annexure 5.2 & Annexure 5.3** respectively. Summary of the Public Consultation is given in the following table.

**Table 5.4. Minutes of Public Consultation Meetings**

<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>	
<b>Location: Kandampalayam</b>	
Date & Time: 29.04.2014, 11 am	<b>Subjects and issued discussed</b>
Venue: Rani Thirumana Mandapam	<ul style="list-style-type: none"> <li>• Requested bypass for Kandampalayam and Maniyanur</li> <li>• Discussed the accident rate and vehicle traffic after the improvement</li> <li>• Proper safety measures like road markings, speed breakers, zebra crossings and signboards should be provided at all sensitive receptor's location</li> <li>• Additional road facilities like foot path, storm water drainage <i>etc.</i> should be provided as part of this project.</li> <li>• Requested the proposed improvement should be restricted within the highway land available and land acquisition should be minimum</li> <li>• Demanded for adequate R&amp;R Packages and Market value for the losing assets and livelihoods.</li> <li>• No. of trees to be felled for the project should be minimum and additional land has to be acquired for compensatory tree plantation.</li> <li>• Requested a link road from near Siva Temple, Mavureddy to NH 7, and it can be act as a bypass for Paramathi town.</li> <li>• Requested to provide the median from Seyyampalayam junction to Perunkurichi junction.</li> <li>• Curves at Otharasu bus stop and Sithalandhur should be straighten as part of the project</li> <li>• Bus stand (with toilet facility) should be provided at Maniyanur and Kandampalayam</li> <li>• Mariamman Temple, Nallur should be protected from the proposed improvement</li> </ul>
Type of Participants: Officials from Highway Department and TNRSP, Local representatives, Businessmen, peasants, land cum building owners etc.	
Total no. of participants: 56	
<b>Malliyakarai to Rasipuram and Rasipuram to Tiruchengode Sections of Road No.4. (SH 79)</b>	
<b>Location: Mangalapuram (Section I)</b>	
Date & Time: 30.04.2014, 11 am	<b>Subjects and issues discussed</b>
Venue: Panchayat Union Elementary School, Mangalapuram	<ul style="list-style-type: none"> <li>• Requested bypass for Mangalapuram town to avoid the impact on livelihood</li> <li>• Requested to restrict the improvement within 16 m.</li> <li>• Proper safety measures like road markings, speed breakers, zebra crossings and signboards should be provided at all sensitive receptor's location</li> <li>• Requested to avoid the tree felling</li> <li>• Demanded for adequate R&amp;R Packages and Market value for the losing assets and livelihoods.</li> </ul>
Type of Participants: Officials from Highway Department and TNRSP, Local representatives, Businessmen, peasants, land cum building owners etc.	
Total no. of participants: 79	

	<ul style="list-style-type: none"> <li>• Demanded to remove the all encroachments on the highway land and accommodate the utilities there.</li> <li>• Requested a detailed meeting is required at next stages of project.</li> </ul>
<b>Location: Vaiyappamalai (Section II)</b>	
Date & Time : 30.04.2014, 3.00 pm	Subjects and issues discussed
Venue: Lakshmi Thirumanna Mandapaam	<ul style="list-style-type: none"> <li>• Requested bypass for Vaiyappamalai and Elachipalayam towns to reduce the impact on existing features at these towns</li> <li>• Improvement should be done using the existing available highway land</li> <li>• Additional road facilities like foot path, storm water drainage etc. should be provided as part of this project</li> <li>• Proper safety measures like road markings, speed breakers, zebra crossings and signboards should be provided at all sensitive receptor's location</li> <li>• Requested the proposed improvement should be restricted within the highway land available and land acquisition should be minimum</li> <li>• Schools along the project road have to be protected from the proposed improvement</li> <li>• Demanded for adequate R&amp;R Packages and Market value for the losing assets and livelihoods.</li> <li>• All the water facilities like bore wells, water channels, Cauvery river water carrying pipes, overhead tanks should not be damaged due to project.</li> <li>• Detailed meeting is required at next stages of project.</li> </ul>
Type of Participants: Officials from Highway Department and TNRSP, Local representatives, Businessmen, peasants, land cum building owners etc.	
Total no. of participants: 134	
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>	
<b>Location: Mohanur</b>	
Date & Time : 01.05.2014, 11 am	Subjects and issued discussed
Venue: Navaldiyan Thirumana Mandapam	<ul style="list-style-type: none"> <li>• Requested bypass for Mohanur town</li> <li>• Improvement should be done using the existing available highway land and minimum acquisition</li> <li>• Demanded to remove the all encroachments on the highway land and thus minimize the acquisition.</li> <li>• No. of trees to be felled for the project should be minimum and the same species has to be planted as compensatory plantation</li> <li>• Cauvery water supply pipelines should be protected from proposed improvement</li> <li>• Water bodies along the project road are to be protected from proposed improvement.</li> <li>• Requested bus bays for all bus stops</li> <li>• All the public utilities should be saved from proposed improvement</li> </ul>
Type of Participants: Officials from Highway Department and TNRSP, Local representatives, Businessmen, peasants, land cum building owners etc.	
Total no. of participants: 51	

While analyzing the opinion sheets collected from public consultation, it became quite clear that the people who are staying and doing the business at town locations are strongly demanding for bypass. The PAFs demanded market value for their losing assets and also asked to explore more options to minimize the negative impact. The consultant has assured that all the issue/ suggestions raised by public will be considered during designing of the project alignment contemplating with technical, social, environmental and economic feasibility.

### 5.3.3. Role and Responsibilities Identified during Consultation

Based on the consultation during feasibility stage of environmental assessment a framework for LA, R&R and Environmental impact mitigation have been envisaged in **Table 5.5** along with responsibilities of officials and expected benefits from the project.

**Table 5.5. Role and Responsibilities Identified after Consultation for TNRSP**

Stakeholders	Roles and Responsibility	Expected Benefit for the Project
Potential Project Affected Persons, Project affected groups, Project Affected Communities, Host population	<ul style="list-style-type: none"> <li>Participate in formal and informal public meeting,</li> <li>Raise critical issues relevant to the environment,</li> <li>Suggest alternative alignments, environmental impact management,</li> <li>Options of widening to save trees and other environmental features,</li> <li>Methodologies for agreement on compensation and assistance,</li> <li>Suggest methodologies for continued participation in project cycle</li> </ul>	<ul style="list-style-type: none"> <li>Easing implementation.</li> <li>Incorporation of good practices (From long term memories of the people) of the past in project design.</li> <li>Planning for road safety issues.</li> <li>Community Capacity building and sense of ownership of the project,</li> </ul>
Engineers –TNRSP and HD	<ul style="list-style-type: none"> <li>Land Acquisition</li> <li>Avenue tree transplantation</li> <li>Ensure continued consultation</li> <li>Participate in Block and District Level Meeting</li> </ul>	<ul style="list-style-type: none"> <li>Easing implementation</li> <li>Reduce the impact of micro climate</li> <li>People oriented planning</li> <li>Ensured public cooperation</li> <li>Determination of value</li> </ul>
District Collector and Forest Officials	<ul style="list-style-type: none"> <li>Enumeration of trees</li> <li>Identification of eco sensitive hot spots</li> <li>Permission for tree cutting</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Easing implementation</li> <li>Helps in designing of alignment at forest areas,</li> <li>Incorporating adequate road safety measures at forest areas</li> </ul>
NGOs/CBOs	<ul style="list-style-type: none"> <li>Ensure public participation in project preparation and implementation,</li> <li>Assist TNRSP and Government for dovetailing Government schemes for income generation schemes,</li> </ul>	<ul style="list-style-type: none"> <li>Public are informed</li> <li>Opinion and preferences of people are known</li> <li>Easy to develop community capacity development plan.</li> </ul>



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## **5.4. Lessons Learnt from Consultation and Suggested Framework for Environmental Management Plan**

### **5.4.1. Issues of Tree Cutting**

Green Tunnel areas are observed about 8.15 Km and 3 Km in Cor 4 – Malliyakarai to Tiruchengode Section of SH 79 and Cor 5 – Mohanur to Namakkal Section of SH 95 respectively. While discussing strategies to save trees in these kinds of stretches people suggested that these trees are mature and adequate safety measures should be taken up during design to save these trees. Therefore it was decided that tree felling would be restricted with maximum compromise in alignment design (within MoRTH limits) and to adopt eccentric widening at green tunnel locations based on considering the geometry, topography and land use condition of the road stretch. Due to this, at least on side of the well grown avenue plantation can be saved, during road improvement. Adequate plantation measures, not limiting to compensatory avenue plantation, will be carried out in government office premises and cultural properties along the project roads.

### **5.4.2. Monitoring Plan and Training**

Information collected during environment surveys (air quality, water quality and other parameters), baseline environmental monitoring and consultation suggests periodic monitoring plan should be gauged by considering specific but limited number of environmental parameters. Therefore, Monitoring strategies for the project should devise a specific plan. Training and capacity building component of environmental team should be part of consolidated training program of TNRSP and budgeted in training and institutional components of the project.

### **5.4.3. Community Properties Resources (CPRs) Enhancement**

Regarding community properties enhancement, village community is willing to come forward to cooperate with HD in the enhancement of religious properties. This is learnt from consultation that generally CPRs do not receive due attention during construction as a result actual enhancement do not take place. Therefore, project authority should plan for alternative implementation arrangement or strengthen its periodic monitoring of physical and financial progress of such enhancement.

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## **Chapter 6. Analysis of Alternatives**

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### **6.1. Background**

This chapter presents a comparative analysis of various alternatives considered to avoid or minimize impacts that would be inevitable if technically (based on design speed and geometrics), best-fit, alignment is followed. Cross sections adopted for the upgradation component are flexible in design to avoid most of the impacts within RoW. An analysis of various alternatives is attempted to arrive at the technically and environmentally best-fit alignment.

### **6.2. Integration of Environmental Consideration in the Alternatives**

The social and environmental considerations were an integral part of the design and environmental assessment process. There are large number of settlements as seen in the baseline environmental scenario along the corridor, where there is constricted RoW and traffic is higher leading to congestion, delay as well as various environmental impacts. Several alternatives are analysed for avoiding localized environmental impacts and arriving at the best-fit alignment.

The retaining walls will be provided in all required locations as given in the Environmental Management Plans. The cut soil material are included in the estimation of soil together with material from borrow areas. The analysis of alternatives has been prepared in accordance with the requirements of the World Bank and GoI guidelines.

### **6.3. “With” And “Without” Scenarios**

In the case of the project roads under consideration, consideration of the ‘No Action’ and ‘Action Alternatives’ have been examined as provided in the following subsections;

#### **6.3.1. No Action Alternative**

The ‘no action alternative’ will prevail and this will continue even when a shorter, attractive, road exists. The economic development of the region will not take place. These roads will have an impact to the local area development especially in the education sector and industries. Rasipuram, Namakkal and Tiruchengode are the major cities along the project corridors. The local people along the project road, even from interior depend on these cities for educations and business activities.

Accidents and road safety will remain as an issue to be resolved. The other aspects that will not be improved include no improvements beyond limited routine maintenance and rehabilitation of roads without any acquisition of land or buildings, removal of trees or other disturbance to the environment. There would be no improvements to drainage systems beyond their restoration to existing levels of service, no removal of impediments to pedestrians or construction of facilities for pedestrians and other slow moving traffic. This would leave the highway in its current appalling state.

The 'no action' option will not allow a change in the level of service along this alignment. The nature of the road is not sufficient to meet the development of the region. The traffic flow is impaired by conflicts between local, and through traffic, mixed with pedestrian movements and inadequate and/or inappropriate roadside facilities along the narrow corridors. The unsafe conditions and the environmental consequences (air and noise pollution and degraded environmental conditions) will continue and worsen. The no improvement condition and in the long term be a serious impediment to the development of the economy and thus to the improvement of conditions for all sections of the population.

### **6.3.2. Action Alternative**

Population and traffic growth will continue to occur and exacerbate in an already critical situation. The "with" scenario, has been determined to be economically viable and would meet the local communities aspirations to a large degree. It would, thereby, contribute to the development goals of the project regions and thus to the entire Tamil Nadu State, improve road safety conditions, enhance economic efficiency and growth potential of the area, and improve the well-being and livelihood of those within the potentially affected area of the project road.

Potential negative environmental impacts associated with the "with" scenario can be reduced through good engineering practice and, where warranted, appropriate mitigation and enhancement actions as specified herein.

## **6.4. Bypass Alignment Study**

During pre-feasibility stage, necessity of bypass for three built-up locations i.e. Rasipuram, During pre-feasibility stage, necessity of bypass for three built-up locations i.e. Rasipuram, Tiruchengode and Namakkal were envisaged. However, Highway Department, Government of Tamil Nadu (GoTN) has proposed bypasses for Rasipuram and Tiruchengode towns under a separate scheme funded by NABARD. For Namakkal town, Outer Ring Road (ORR) was proposed by Highway Department, GoTN under a separate scheme funded by NABARD. Hence, no bypass study was conducted by consultants for these towns.

## **6.5. Realignment Study**

All geometric design elements have been carried out as per design standards stipulated for project in consonance with IRC codal provisions. Comprehensive design standards, which link individual design elements to best estimates of actual speed have been utilized. The objective is that drivers must not be presented with the unexpected. The emphasis has been given on maintaining continuity or giving adequate warning where it could not be made. There are some locations on the project roads which are critical from geometric deficiencies. Realignments are considered for geometric improvements at these locations.

### **6.5.1. Realignment Proposed for Tiruchengode to Paramathy Section of Road No. 2 (SH 86)**

One realignment is proposed for Road No 2 where the geometric improvement is required. The existing alignment from Km 55+600 to Km 55+750 has a curve having existing speed of about 35 to 40 Km/h with short tangents giving the appearance of kind. Also, subsequent section has sharp curve

which has existing speed of about 30 Km/h. So in order to avoid discomfort to road users, the location is geometrically improved by proposing short realignment for a length of 150 m. Existing land use of proposed realignment is Agriculture / Open land. There are 28 trees to be cut for the proposed realignment. Out of these 22 trees are government and 6 trees are private. One shrine is likely to be affected due to proposed realignment. Layout plan of the realignment location is presented in **Annexure 6.1**.

### **6.5.2. Realignment Proposed for Malliyakarai to Rasipuram (Section I) and Rasipuram to Tiruchengode (Section II) Sections of Road No.4. (SH 79)**

The necessity of realignment is felt at seven locations in the Road No. 4 (SH79), which are presented in **Table 6.1**.

**Table 6.1. Details of Realignments Proposed for Road No.4**

Sl. No.	Existing Chainage (Km)		Length of Existing Road Realigned (m)	Reason for Realignment
	From	To		
<b>Section I - Malliyakarai – Rasipuram Section of SH 79</b>				
1	0+320	0+500	180	Geometric Deficiency
2	2+900	3+130	230	Geometric Deficiency
3	8+260	8+650	390	Geometric Deficiency
4	20+600	20+800	200	Sharp Curve
5	29+600	29+930	330	Geometric Deficiency
<b>Section II - Rasipuram – Tiruchengode Section of SH 79</b>				
1	59+900	60+300	400	Geometric Deficiency
2	61+450	62+000	550	Sharp Curve

#### **6.5.2.1. Realignment from Km 0+320 to Km 0+500**

The existing alignment between Km 0+320 to Km 0+500 passes through series of curves having radii varying from 100m to 170m and the speed at these locations is 35 to 50 Km/h. Considering the sharp curves, short tangents and has speed as low as 35 Km/h, the preceding and subsequent sections have 80 Km/h. This sudden variation in speed and poor geometry at this location is leading to discomfort for road users and in turn resulting in accidents.

Considering above constraints, a realignment is proposed at this location for a length of 180m. This avoids the 3 minor curves and can attain 80 Km/h speed. The general land use of the region is minor settlement and open land. However no buildings will be affected due to proposed realignment. 22 trees are affected due to proposed realignment, all are government trees. One canal will cross the proposed realignment. Other than this, realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.2. Realignment from Km 2+900 to Km 3+130**

The existing alignment from Km 2+900 to Km 3+130 is having reverse curves with short tangents which gives appearance of kinks. To avoid distortions in appearance and discomfort for road commuters, the location is proposed for realignment. Total length of proposed realignment is 230m. This avoids the 2 minor curves and can attain 80 Km/h speed. The general land use of the region is

open land, minor settlement and agriculture. There are 33 trees are affected due to proposed realignment. Out of these, 32 trees are government trees and one tree is private. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.3. Realignment from Km 8+260 to Km 8+650**

The existing alignment between Km 8+260 and Km 8+650 is having reverse curves with short tangents which gives appearance of kinks. To avoid distortions in appearance and discomfort for road users, the location is proposed for realignment. Total length of proposed realignment is 390m. This avoids the 2 minor curves and can attain 80 Kmph speed. The general landuse of the region is agricultural and open land. There are 51 trees are affected due to proposed realignment. Out of these 48 trees are government trees and 3 trees are private trees. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.4. Realignment from Km 20+600 to Km 20+800**

The existing alignment between Km 20+600 and Km 20+800 passes through sharp curves with short tangents having radii varying from 70 to 90m and the speed at these locations is 35 to 40Kmph, the preceding and subsequent sections have 65 to 80 Kmph. This sudden variation in speed and poor geometry at this location is leading to discomfort for road users and in turn resulting in accidents.

Total length of proposed realignment is 200m. This avoids the one minor curves and can attain 65 Kmph speed. The general landuse of the region is minor builtup area. 14 trees are affected due to proposed realignment. Out of these 6 trees are government and 8 trees are government. As per preliminary study 5 residential houses may get affected due to proposed alignment. One minor water tank (syntex tank) is falling within the proposed realignment location. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.5. Realignment from Km 29+600 to Km 29+930**

The existing alignment between Km 29+600 and Km 29+930 is having compound curves with short tangents. To ensure safe and smooth transition from one curve, the location is proposed for realignment. Total length of proposed realignment is 330m. This avoids the two minor curves and can attain 65 Kmph speed. The general landuse of the region is agriculture. 12 trees are affected due to proposed realignment. As per preliminary study one residential house may get affected due to proposed realignment. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.6. Realignment from Km 59+900 to Km 60+300**

The existing alignment between Km 59+900 to Km 60+300 passes through series of curves with short tangents, considering the poor geometry at this location is proposed for realignment. Total length of proposed realignment is 400m. This avoids the three minor curves and can attain 80 Kmph speed. The general landuse of the region is minor settlement and agricultural land. There are 24 trees affected due to proposed realignment. Out of these 22 trees are government trees and 2 trees are private trees. As

per preliminary study five residential houses may get affected due to proposed realignment. Two minor water tanks (syntax tank) and one bore well are falling within the proposed realignment location. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.2**.

#### **6.5.2.7. Realignment from Km 61+450 to Km 62+000**

The existing alignment between Km 61+450 and Km 62+000 passes through series of curves having radii varying from 50m to 110m and the speed at these locations is 35 to 50Kmph proposed for realignment. Total length of proposed realignment is 550m.

Existing major bridge for Thirumanimuthar river is located at chainage 61+955 consists of 15 spans of 4.4m each, with a total length of 66m. This Bridge has carriageway width inadequate to accommodate standard two lane traffic. The RCC deck slab is in fair condition. The superstructure has been united recently. RCC pillars with Steel rods are provided for handrail but same is in poor condition. Condition of the substructure is fair and vegetation growth is observed on superstructure. The bridge is hydraulically adequate and the drainage spouts are given but not functioning.



**Major Bridge at Km 61+955**

The section has sharp curves, short tangents and has speed as low as 35 Kmph, the preceding and subsequent sections have speed varying from 65 to 80 Kmph. This sudden variation in speed and poor geometry at this location is leading to discomfort for road users and in turn resulting in accidents.

The general landuse of the region is open land area. There are 90 trees are affected due to the proposed realignment Out of these, 82 trees are Government trees and 8 trees are private trees. As per preliminary study five residential houses are may get affected due to proposed realignment. Both existing and proposed alignment are crossing Thirumanimuthar River at this location. Thirumanimuthar River is a seasonal river, having water during rainy season. As per preliminary study three residential houses may get affected due to proposed realignment. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas.

Considering above constraints, a realignment has been proposed at this location with a major bridge. Major Bridge of total length 67.5m with a span arrangement of 5 x 13.5m is proposed in the realignment. Total width of 12.9m, comprising of 10.5m wide carriageway and 0.75m wide raised safety kerb & 0.45m wide crash barrier on either side is proposed. RCC T - beam superstructure and

RCC substructure with open foundation is proposed. Drawing of the realignment location is presented as **Annexure 6.2**.

### 6.5.3. Realignment Proposed for Mohanur to Namakkal Section of Road No.5 (SH 95)

The necessity of realignment is felt two locations in Road No. 5 (SH95). Details of realignment proposed are presented in **Table 6.2**.

**Table 6.2. Details of Realignments Proposed for Road No.5**

Sl. No.	Existing Chainage (Km)		Length of Existing Road Realigned (m)	Reason for Realignment
	From	To		
1	2+020	2+475	450	Geometric Improvement
2	6+595	6+960	350	Geometric Improvement

#### 6.5.3.1. Realignment from Km 2+020 to Km 2+475

The existing alignment between Km2+020 to Km 2+475 passes through series of curves with short tangents, considering the poor geometry at this location is proposed for realignment. Total length of proposed realignment is 450m.

Existing minor bridge is located at Km 2+280 consist of 9 spans of varying length with a total length of 22.4m. The depth from the road level to bed level is 1.5m. Footpaths are not provided. Clear carriageway width is 7.25m and the total width is 8m. RCC slab superstructure and solid SSM wall type substructures with open foundations are provided. HFL at the bridge location is 0.2m from the bottom of the soffit of slab. Skew angle of 44.7 degree. Bituminous wearing coat and hand railing are provided. One side approach of the Bridge comes on a curve. There is a Railway track on LHS side, which is almost parallel to the existing minor bridge.

This Bridge has carriageway width inadequate to accommodate standard two lane traffic. The RCC deck slab is in fair condition. The superstructure has been united recently. RCC pillars with Steel rods are provided for handrail but same is in fair condition. Condition of the substructure is fair. The bridge is hydraulically inadequate.



**Minor Bridge at Km 2+280**

The general landuse of the region is Agricultural land. There are 52 trees are to be felled due to proposed realignment. Out of these 44 trees are Government trees and 8 trees are private trees. There is one pond located on RHS of the existing project alignment. Proposed realignment is passing through a small portion of the pond. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas.

Considering above constraints, realignment has been proposed at this location with a minor bridge. Minor Bridge of total length 18.5m with a span arrangement of 3 x 5.5m is proposed in the realignment at design chainage 2+279. Total width of 12.9m, comprising of 10.5m wide carriageway and 0.75m wide raised safety kerb & 0.45m wide crash barrier on either side is proposed. RCC Box bridge is proposed. Drawing of the realignment location is presented as **Annexure 6.3**.

#### **6.5.3.2. Realignment from Km 6+595 to Km 6+960**

The existing alignment between Km 6+595 to Km 6+960 passes through series of curves with short tangents, considering the poor geometry at this location is proposed for realignment. Total length of proposed realignment is 350m. This avoids the two minor curves and can attain 80 Kmph speed. The general landuse of the region is agricultural / open land. 59 trees are to get affected due to proposed realignment. Out of this, 46 trees are government trees and 13 trees are private trees. Realignment location is free from sensitive receptors, religious structures, cultural properties and forest areas. Drawing of the realignment location is presented as **Annexure 6.3**.



## Chapter 7. Project Impacts and Issues

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### 7.1. Project Impact and Issues

This chapter discusses the impacts due to the project activities upon different components of the local and / or regional environment. With increasing socio-economic activities, the demand for an efficient transportation network also increases. It is required to establish an efficient, optimized and durable road infrastructure for the overall social and economic development throughout the country. It is quite evident from the past experience that road revamping / construction projects give rise to diverse impacts that are beneficial as well as adverse on environmental and social profile of the project influence area. The adverse impacts associated with the project may be long term or temporary and its intensity may also vary both spatially and temporally depending on the nature of project intervention during the various stages of the project and the baseline environmental quality of the project area. Major factors influencing the environmental factors are:

- Settlement Pattern
- Topography / terrain – plain, rolling or hilly
- Land use pattern – agricultural, built-up (residential, commercial, industrial) etc.
- Other physical features

As mentioned in the earlier chapters the improvement proposal includes 2 lane road with paved shoulder configuration along with road furniture and other accessories. The direct impact zone is in the range of 16-23 m of corridors depending upon the land use pattern. Magnitude of indirect impact varies depending upon the location of environmental receptors and type of impact. The planning of project intervention and its impacts on the environmental, social and cultural components were studied for pre-construction, construction and operation stages.

**Tables 7.1A & 7.1B** given below presents the general environmental impacts expected due to the proposed upgradation of the project road. Impacts have been assessed based on the information collected from the screening & scoping of environmental attributes at feasibility stage. The subsequent sections deal with the prediction of impacts due to the project on the natural environment and socio & cultural environment.

Besides the impact on natural environment, there will be socio-economic impacts due to disruptions on the social and economic interactions of communities. This involves effect on both the adjacent communities (mostly direct) as well as the nearby communities (mostly indirect). The various impacts have been detailed as:

- General impacts that apply to the entire project corridor,
- Specific impacts on likely properties and PAPs, within the Corridor of Impact (CoI) of the project corridors.

Matrix method was followed for the identification and evaluation of impacts. The activity - impact identification matrix is presented as **Annexure 7.1**.

**Table 7.1 A. General Impacts on Natural Environment**

Project Activity	Planning and Design Phase	Pre-construction Phase		Construction Phase					Road Operation	Indirect effects of operation or Induced development
		Removal of Structures	Removal of trees and vegetation	Earth works including quarrying	Laying of pavement	Vehicle & Machine operation & maintenance	Asphalt & crusher plants	Sanitation & Waste (labour campus)		
Env. component Affected	Land acquisition	Removal of Structures	Removal of trees and vegetation	Earth works including quarrying	Laying of pavement	Vehicle & Machine operation & maintenance	Asphalt & crusher plants	Sanitation & Waste (labour campus)	Vehicle operation	
Air		Dust generation during dismantling	Reduced buffering of air and noise pollution, Hotter, drier microclimate	Dust generation	Asphalt odour	Noise and dust pollution	Noise, soot, odour and dust pollution	Odour / smoke	Noise and dust pollution	other pollution
Land	Loss of productive Land	Generation of debris	Erosion and loss of top soil	Erosion and loss of top soil		Contamination by fuel and lubricants Compaction	Contamination and Compaction of soil	Contamination from wastes	Spill from accidents Deposition of lead	Change in cropping pattern
Water	Loss of water sources	Siltation due to loose earth	Siltation due to loose earth	Alteration of drainage Break in continuity of ditches Siltation, Stagnant water pools in quarries.	Reduction of ground water recharge area	Contamination by fuel and lubricants	Contamination by asphalt leakage or fuel	Contamination from wastes Overuse	Spill Contamination by fuel, lubricants and washing of vehicles	Increased contamination of ground water
Noise		Noise Pollution	Noise Pollution due to machinery	Noise Pollution from DG sets		Noise pollution	Noise Pollution		Noise Pollution	Noise pollution
Flora		Loss of		Lowered		Removal of	Lower	Felling trees	Impact of	

Project Activity	Planning and Design Phase	Pre-construction Phase		Construction Phase					Road Operation	Indirect effects of operation or Induced development	
				productivity	Loss of ground for vegetation	vegetation	productivity	for fuel			Use as fuel wood
		Biomass		productivity	Loss of ground for vegetation	vegetation	productivity	for fuel	Use as fuel wood	pollution on vegetation Lowered productivity	
Fauna			Disturbance Habitat loss	Disturbance		Disturbance	Disturbance	Poaching	Collision with traffic	Distorted habitat	

**Table 7.1 B. General Impact on Social and Cultural Environment**

Project Activity	Planning and Design Phase	Pre-Construction Phase			Construction Phase					Operation	
					Direct	Indirect	Induced	development			
Env. Component Affected	Design decisions & Implementation policies	Land acquisition	Removal of Structures	Removal of trees & vegetation	Earth works including quarrying	Laying of pavement	Vehicle & machine operation & maintenance	Asphalt and crusher plants	Labour Camps	Vehicle operation	-
Agricultural land	-	Change in land prices	Loss of land economic value	Loss of standing crops	Loss of productive land	-	-	Dust on agricultural land reduce n productivity	-	-	Conversion of Agricultural Land
Buildings and built structures	-	-	Loss of structures, Debris generation, Noise and Air pollution	-	Noise and vibration may cause damage to structures	-	Noise and vibration may cause damage to structures	Dust accumulation on building and structure	-	Vibration and noise	Change in building use and characteristics

Project Activity	Planning and Design Phase	Pre-Construction Phase			Construction Phase					Operation	
										Direct	Indirect Induced development
People and Community	Anxiety and fear among community	-	Displacement of people Psychological impact on people loss of livelihood	Loss of shade & community trees, Loss of fuel wood and fodder, Loss of income	Noise and Air pollution	Odour and dust	Noise and Air pollution, Collision with pedestrians livestock and vehicles	Air and noise pollution and discomfort	Community clashes with migrant labour	Noise pollution, Risk of accident	Induced pollution
Cultural Assets	-	-	Displacement loss of structure from RoW	Loss of sacred trees.	Noise, vibration may cause damage to structure	-	Damage from vibration & air pollution	Dust accumulation	-	Damage from vibration & air pollution	-
Utilities and Amenities	-	-	Interruption in supply	-	-	-	Damage to utility and amenities	Dust accumulation on water bodies	Pressure on existing amenities	-	-
Labour's Health & Safety	-	-	-	-	Increase of stagnant water and disease	Asphalt odour and dust	Collisions with vehicles, pedestrians & livestock	Impact on health due to inhalation of dust	Increase in communicable diseases	Collisions pedestrians & livestock	-

## 7.2. Project Intervention

The project intervention necessitates dismantling of few roadside residential and commercial structures, clearing of vegetation and removal of trees coming in the proposed improvement. In addition project road up-gradation will require huge quantity of borrow earth and aggregates. Details of raw materials required for Phase-I roads under TNRSP-II PPC03 are presented in **Table 7.6**. The quarries for these aggregates are locally available and hence no significant direct impact is envisaged.

**Table 7.2: Potential Impacts and Requirement of Man, Materials & Machinery**

Sr. No.	Description	Unit	Quantity				Total	Remarks
			Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)		
<b>Potential Impacts</b>								
1	Land Acquisition	Ha	4.3049	1.4206	7.97.66	0.3504	6.0759	Moderate Impact
2	Dismantling of Structures	No.s	83	117	95	21	316	Residential/Commercial/both
3	Removal of trees	No.s	2161	2187	1686	1178	7212	.
4	Removal of vegetation	Ha	22.94	26.29	17.83	12.03	79.1	.Including camp area and along alignment
<b>Man, Material and Machinery Requirement for Construction Activity</b>								

Sr. No.	Description	Unit	Quantity				Total	Remarks
			Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Mallyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mallyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)		
5	Skilled	No.s	15	18	11	8	52	Total No.s of man days divided by time allotted for construction activity
6	Semi Skilled	No.s	48	58	38	26	170	Total Machinery working time divided by 8hours of operator working.
7	Technicians	No.s	9	10	6	4	29	One mate/supervisor over 8 labours.
8	Engineers	No.s	12	15	10	6	43	
	Managers	No.s	10	11	7	5	33	
9	Borrow Earth	cum	86,110	82,400	52,828	33,407	2,54,745	Requirement for embankment, subgrade shoulder etc
10	Fine Aggregate	tonnes	7366	21379	7045	11049	46,839	Concrete works, screening material and in

Sr. No.	Description	Unit	Quantity				Total	Remarks
			Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Mallyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mallyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)		
								GSB
11	Coarse Aggregate	cum	289,823	388,271	244,226	170,609	10,92,929	WMM, GSB, concrete and BT works
12	Water	Kilo litre	42977	41160	29567	54128	1,67,832	All construction activities and for worker use.
13	Crusher Plant/BT plant/ Batching Plant	Nos.	1	1	1	1	3	Based on the project requirement, capacity will be judged.
16	Paver, Grader,	Nos.	1	1	1	1	3	Based on the project requirement, capacity will be judged.
17	Dumpers	Nos.	10	5	5	10	30	Based on the project requirement, capacity will be judged.

### 7.2.1. Land Acquisition

Up-gradation of project road requires acquisition of agricultural land, commercial/residential land and open land, wherever the existing RoW is not accommodating design scheme. Further, the horizontal and vertical alignment will be improved to the standard as per IRC/MoRTH guidelines, which requires additional land for realignments to avoid the geometric deficiency.

The total land to be acquired for the strengthening of Tiruchengode to Paramathy section of SH 86 is 5.20 ha, Malliyakarai to Tiruchengode section of SH 79 is 9.39 Ha and Mohanur to Namakkal section of SH 95 is 0.35 Ha. **Table 7.2** presents the details of land acquisition for the project roads.

**Table 7.2. Details of Land Acquisition**

Sl. No.	Village Name	Taluk Name	Area to be Acquired (Ha Are Sqm)
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>			
1	Pokkampalayam	Tiruchengode	0.08.17
2	Athipalaiyam	Tiruchengode	0.29.62
3	Pudupuliyampatti	Tiruchengode	1.41.10
4	Chitalandur	Tiruchengode	0.89.20
5	Maniyanur	Paramathi	0.23.12
6	Nallur	Paramathi	0.64.53
7	Kunnamalai	Paramathi	0.06.64
8	Ramadevam	Paramathi	0.02.69
9	Melsathampur	Paramathi	0.04.83
10	Nadandai	Paramathi	0.00.79
11	Kudacheri	Paramathi	No LA
12	Arthanaripalayam	Paramathi	0.34.70
13	Pillaikalathur	Paramathi	0.12.98
14	Paramathi	Paramathi	0.12.12
Total			4.30.49
<b>Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)</b>			



Sl. No.	Village Name	Taluk Name	Area to be Acquired (Ha Are Sqm)
1	Malliyakari	Attur	0.26.87
2	Rangappanayakan Palayam	Attur	0.00.94
3	Gopalapuram	Attur	0.04.89
4	Thimmanayakanpatti	Rasipuram	0.01.43
5	Eswaramurthypalayam	Rasipuram	0.19.78
6	Mangalapuram	Rasipuram	0.09.08
7	Navalpatty	Rasipuram	0.07.09
8	Ailpatty	Rasipuram	0.23.07
9	Karkoodalpatty	Rasipuram	0.44.11
10	Moolapallypatti	Rasipuram	0.03.67
11	Namagiripettai	Rasipuram	0.01.13
Total			1.42.06
<b>Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)</b>			
1	Ponkurichy	Rasipuram	0.09.02
2	Minnampalli	Tiruchengode	1.72.85
3	Nagarpalayam	Tiruchengode	0.24.57
4	Maraparai	Tiruchengode	2.36.71
5	Konnaiyar	Tiruchengode	1.92.28
6	Agaram	Tiruchengode	0.18.45
7	Kilapalayam	Tiruchengode	0.01.84
8	Kumarapalayam	Tiruchengode	0.88.21
9	Unjanai	Tiruchengode	0.48.92
10	Ilayampalayam	Tiruchengode	0.04.81
Total			7.97.66
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>			
1	Mohanur	Namakkal	0.01.01
2	Rasipalayam	Namakkal	0.10.52
3	Pettaipalayam	Namakkal	0.00.62
4	Ariyur	Namakkal	0.21.60
5	Aniyapuram	Namakkal	0.01.29
Total			0.35.04

Sl. No.	Village Name	Taluk Name	Area to be Acquired (Ha Are Sqm)
<b>Grand Total</b>			<b>6.07.59</b>

The project roads run through fertile agricultural lands and settlements and hence, the impacts of land acquisition are expected to have significant effect on livelihood and economic activities of the project area.

### 7.2.2. Removal of Structures

During the proposed improvements of the project roads, roadside dwellings and business units would be impacted. Engineering design team in consultation with environmental and social team has minimized/restricted land width in contiguous built-up areas. Even after such engineering efforts some of this residential and business unit required to be dismantled (partially or fully). **Table 7.4A.** Quantity of Materials to be Removed

Sr. No.	Item	Unit	Quantity of Materials to be Removed				Remark
			Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)	
1	Bituminous Material	Cum	62704	9935.1	11932	8410.5	No significant impact because it will be reused
2	Pavement Crust	Cum	36638	42889	27846	18739	No significant impact because it will be reused
3	Stone Masonry	Cum	156	294	252	224	No significant impact because it will be reused
4	RCC	Cum	238	447	364	354	No significant impact because it will be reused
5	Hume Pipes	m			48		

**Table 7.4B. Removal of Roadside Structures (Residential/Commercial)**

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>									
1	54+260	55+300	Pokampalayam	No.of Structures	1	-	-	-	1
				Total Area	105	-	-	-	105
				Affected Area	15	-	-	-	15
2	54+500	55+930	Athipalaiyam	No.of Structures	6	-	-	-	6
				Total Area	476	-	-	-	476
				Affected Area	173	-	-	-	173
3	55+700	55+830	Pudupuliyampatti	No.of Structures	7	1	-	1	9
				Total Area	586	20	-	75	681
				Affected Area	119	4	-	15	138
4	55+650	61+230	Chitalandur	No.of Structures	12	8	5	1	26
				Total Area	3560	1344	1386	500	6790
				Affected Area	366	449	203	10	1028
5	61+230	65+330	Maniyanur	No.of Structures	5	1	2	2	10
				Total Area	1434	88	480	216	2218
				Affected Area	49	15	40	108	212
6	65+330	69+970	Nallur	No.of Structures	9	7	2	2	20
				Total Area	2176	460	1240	1100	4976
				Affected Area	284	56	410	80	830
7	69+970	70+950	Kunnamalai	No.of Structures	-	-	-	1	1
				Total Area	-	-	-	90	90
				Affected Area	-	-	-	12	12
8	70+950	71+750	Ramadevam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
9	71+750	73+670	Melsathampur	No.of Structures	-	-	1	-	1
				Total Area	-	-	80	-	80
				Affected Area	-	-	15	-	15

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
10	73+670	74+940	Nadandai	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
11	74+340	74+670	Kudacheri	No.of Structures	-	-	2	-	2
				Total Area	-	-	452	-	452
				Affected Area	-	-	134	-	134
12			Arthanaripalayam	No.of Structures	1	1	-	1	3
				Total Area	250	32	-	72	354
				Affected Area	5	8	-	8	21
13	74+940	79+110	Pillaikalathur	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
14	79+110	80+972	Paramathi	No.of Structures	2	-	-	2	4
				Total Area	104	-	-	352	456
				Affected Area	64	-	-	22	86
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>									
1	0+000	3+470	Malliyakarai	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
2	3+470 (RHS)	5+550	Rangappanaikanpalaiyam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
3	3+470 (LHS)	5+550	Gopalapuram	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
4	5+550	8+150	Thimmanayakampatti	No.of Structures	6	-	2	1	8
				Total Area	524	-	96	32	652

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
				Affected Area	144	-	12		156
5	8+150	12+720	Iswaramurthipalayam	No.of Structures	12	1	1	6	20
				Total Area	621	88	17	198	924
				Affected Area	209	8	17	22	256
6	12+720	15+750	Managalapuram	No.of Structures	25	5	5	2	37
				Total Area	1110	419	637	64	2230
				Affected Area	442	117	89	10	658
7	15+750	17+000	Navalpatti	No.of Structures	4	-	-	-	4
				Total Area	396	-	-	-	396
				Affected Area	38	-	-	-	38
8	17+000	20+180	Ayilpatti	No.of Structures	21	5	3	2	31
				Total Area	2516	322	800	52	3690
				Affected Area	695	83	64	5	847
9	20+180	22+540	Karkudalpatti	No.of Structures	7	2	1	-	10
				Total Area	489	131	180	-	80
				Affected Area	290	76	2	-	368
10	22+540	26+750	Moolappallipatti	No.of Structures	3	3	-	-	6
				Total Area	272	190	-	-	462
				Affected Area	272	115	-	-	387
11	26+750	30+635	Namagiripettai	No.of Structures	-	-	-	1	1
				Total Area	-	-	-	30	30
				Affected Area	-	-	-	30	30
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>									
1	51+300	51+650	Ponkurichi	No.of Structures	4	0	3	0	7
				Total Area	254	-	406	-	660
				Affected Area	73	-	114	-	187

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
2	51+650	53+900	Minnampalli	No.of Structures	6	2	1	1	10
				Total Area	488	52	72	50	662
				Affected Area	198	37	72	40	347
3	53+900	55+300	Munjanur	No.of Structures	2	2	-	1	5
				Total Area	150	190	-	60	400
				Affected Area	58	40	-	15	113
4	55+300	59+080	Marapparai	No.of Structures	4	4	-	-	8
				Total Area	459	619	-	-	1078
				Affected Area	179	161	-	-	340
5	59+080	63+100	Konnayar	No.of Structures	6	6	3	-	15
				Total Area	872.75	246.5	145.75	-	1265
				Affected Area	229	122	29	-	380
6	63+100	66+550	Agaram	No.of Structures	2	8	4	1	15
				Total Area	122	352	218	40	732
				Affected Area	39	158	117	20	334
7	66+550	66+820	Kilapalaiyam	No.of Structures	5	1	3	-	9
				Total Area	225	48	270	-	543
				Affected Area	-	-	-	-	
8	66+820	69+160	Kumarapalayam	No.of Structures	9	4	6	1	20
				Total Area	564	166	506	-	
				Affected Area	183	141	145	-	
9	69+160	70+160	Unjanai	No.of Structures	0	2	0	3	5
				Total Area	-	90	-	12	102
				Affected Area	-	-	-	12	12
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>									
1	0+000	1+050	Mohanur	No.of Structures	1	11	-	-	12

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
				Total Area	120	568	-	-	688
				Affected Area	50	322	-	-	372
2	0+600	4+300	Rasipalayam	No.of Structures	5	-	2	1	7
				Total Area	253	-	300	40	593
				Affected Area	145	-	150	4	299
3	2+250	3+760	Pettaipalayam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
4	3+760	7+580	Ariyur	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
5	7+580	10+950	Aniyapuram	No.of Structures	1	-	-	-	1
				Total Area	63	-	-	-	63
				Affected Area	63	-	-	-	63
6	10+950	13+385	Laddivadi	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0

A **and 7.4B** provides the details of the structures affected.



**Table 7.4A. Quantity of Materials to be Removed**

Sr. No.	Item	Unit	Quantity of Materials to be Removed				Remark
			Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)	
1	Bituminous Material	Cum	62704	9935.1	11932	8410.5	No significant impact because it will be reused
2	Pavement Crust	Cum	36638	42889	27846	18739	No significant impact because it will be reused
3	Stone Masonry	Cum	156	294	252	224	No significant impact because it will be reused
4	RCC	Cum	238	447	364	354	No significant impact because it will be reused
5	Hume Pipes	m			48		

**Table 7.4B. Removal of Roadside Structures (Residential/Commercial)**

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>									
1	54+260	55+300	Pokampalayam	No.of Structures	1	-	-	-	1
				Total Area	105	-	-	-	105
				Affected Area	15	-	-	-	15
2	54+500	55+930	Athipalaiyam	No.of Structures	6	-	-	-	6
				Total Area	476	-	-	-	476
				Affected Area	173	-	-	-	173
3	55+700	55+830	Pudupuliyampatti	No.of Structures	7	1	-	1	9
				Total Area	586	20	-	75	681
				Affected Area	119	4	-	15	138

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
4	55+650	61+230	Chitalandur	No.of Structures	12	8	5	1	26
				Total Area	3560	1344	1386	500	6790
				Affected Area	366	449	203	10	1028
5	61+230	65+330	Maniyanur	No.of Structures	5	1	2	2	10
				Total Area	1434	88	480	216	2218
				Affected Area	49	15	40	108	212
6	65+330	69+970	Nallur	No.of Structures	9	7	2	2	20
				Total Area	2176	460	1240	1100	4976
				Affected Area	284	56	410	80	830
7	69+970	70+950	Kunnamalai	No.of Structures	-	-	-	1	1
				Total Area	-	-	-	90	90
				Affected Area	-	-	-	12	12
8	70+950	71+750	Ramadevam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
9	71+750	73+670	Melsathampur	No.of Structures	-	-	1	-	1
				Total Area	-	-	80	-	80
				Affected Area	-	-	15	-	15
10	73+670	74+940	Nadandai	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
11	74+340	74+670	Kudacheri	No.of Structures	-	-	2	-	2
				Total Area	-	-	452	-	452
				Affected Area	-	-	134	-	134
12			Arthanaripalayam	No.of Structures	1	1	-	1	3
				Total Area	250	32	-	72	354

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
				Affected Area	5	8	-	8	21
13	74+940	79+110	Pillaikalathur	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
14	79+110	80+972	Paramathi	No.of Structures	2	-	-	2	4
				Total Area	104	-	-	352	456
				Affected Area	64	-	-	22	86
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>									
1	0+000	3+470	Malliyakarai	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
2	3+470 (RHS)	5+550	Rangappanaikanpalaiyam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
3	3+470 (LHS)	5+550	Gopalapuram	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
4	5+550	8+150	Thimmanayakampatti	No.of Structures	6	-	2	1	8
				Total Area	524	-	96	32	652
				Affected Area	144	-	12		156
5	8+150	12+720	Iswaramurthipalayam	No.of Structures	12	1	1	6	20
				Total Area	621	88	17	198	924
				Affected Area	209	8	17	22	256
6	12+720	15+750	Managalapuram	No.of Structures	25	5	5	2	37
				Total Area	1110	419	637	64	2230
				Affected Area	442	117	89	10	658
7	15+750	17+000	Navalpatti	No.of Structures	4	-	-	-	4

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
				Total Area	396	-	-	-	396
				Affected Area	38	-	-	-	38
8	17+000	20+180	Ayilpatti	No.of Structures	21	5	3	2	31
				Total Area	2516	322	800	52	3690
				Affected Area	695	83	64	5	847
9	20+180	22+540	Karkudalpatti	No.of Structures	7	2	1	-	10
				Total Area	489	131	180	-	80
				Affected Area	290	76	2	-	368
10	22+540	26+750	Moolappallipatti	No.of Structures	3	3	-	-	6
				Total Area	272	190	-	-	462
				Affected Area	272	115	-	-	387
11	26+750	30+635	Namagiripettai	No.of Structures	-	-	-	1	1
				Total Area	-	-	-	30	30
				Affected Area	-	-	-	30	30
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>									
1	51+300	51+650	Ponkurichi	No.of Structures	4	0	3	0	7
				Total Area	254	-	406	-	660
				Affected Area	73	-	114	-	187
2	51+650	53+900	Minnampalli	No.of Structures	6	2	1	1	10
				Total Area	488	52	72	50	662
				Affected Area	198	37	72	40	347
3	53+900	55+300	Munjanur	No.of Structures	2	2	-	1	5
				Total Area	150	190	-	60	400
				Affected Area	58	40	-	15	113
4	55+300	59+080	Marapparai	No.of Structures	4	4	-	-	8
				Total Area	459	619	-	-	1078

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
				Affected Area	179	161	-	-	340
5	59+080	63+100	Konnayar	No.of Structures	6	6	3	-	15
				Total Area	872.75	246.5	145.75	-	1265
				Affected Area	229	122	29	-	380
6	63+100	66+550	Agaram	No.of Structures	2	8	4	1	15
				Total Area	122	352	218	40	732
				Affected Area	39	158	117	20	334
7	66+550	66+820	Kilapalaiyam	No.of Structures	5	1	3	-	9
				Total Area	225	48	270	-	543
				Affected Area	-	-	-	-	
8	66+820	69+160	Kumarapalayam	No.of Structures	9	4	6	1	20
				Total Area	564	166	506	-	
				Affected Area	183	141	145	-	
9	69+160	70+160	Unjanai	No.of Structures	0	2	0	3	5
				Total Area	-	90	-	12	102
				Affected Area	-	-	-	12	12
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>									
1	0+000	1+050	Mohanur	No.of Structures	1	11	-	-	12
				Total Area	120	568	-	-	688
				Affected Area	50	322	-	-	372
2	0+600	4+300	Rasipalayam	No.of Structures	5	-	2	1	7
				Total Area	253	-	300	40	593
				Affected Area	145	-	150	4	299
3	2+250	3+760	Pettaipalayam	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0

Sl. No	Chainage		Name of the Village	Features	Residential	Commercial	Resi & Comm	Others	Total
	From	To							
4	3+760	7+580	Ariyur	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0
5	7+580	10+950	Aniyapuram	No.of Structures	1	-	-	-	1
				Total Area	63	-	-	-	63
				Affected Area	63	-	-	-	63
6	10+950	13+385	Laddivadi	No.of Structures	-	-	-	-	0
				Total Area	-	-	-	-	0
				Affected Area	-	-	-	-	0

### 7.2.3. Removal of Trees and Vegetation

Table 7.3A present the details of trees and vegetation to be removed for the upgradation, widening and geometric improvement of the project roads. Maximum efforts have been taken to preserve existing vegetation. Only the trees that are coming within the formation width (between toe lines) are to be felled.

Table 7.5A. Removal of Vegetation

Sr. No	Location/ Description	Vegetation to be removed (Hectares)				Total	Reason for removal of Vegetation
		Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	Mohanur to Namakkal Section of Road No. 5 (SH 95)		
1	Along the alignment	20.94	24.29	15.83	10.03	71.1	Clearing and grubbing for construction activity
2	Plant site	2	2	2	2	8	Construction camp and stock yard
3	Diversion	0	0	0	0	0	Diversion
4	Bypass	0	0	0	0	0	Bypass Location
5	Trees Nos	2161	2187	1686	1178	7212	Along the alignment

Table 7.3B. Summary of Trees Proposed to be Felled for the TNRSP-II PPC03 Roads<sup>2</sup>

Trees coming in	Categorisation of trees based on GBH													
	< 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		>180 cm	
	L	R	L	R	L	R	L	R	L	R	L	R	L	R
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>														
Existing RoW	580	345	147	116	105	56	199	73	84	68	59	48	117	136
Realignment	-	25	-	2	-	0	-	0	-	1	-	0	-	0
<b>Grand Total</b>														<b>2161</b>
<b>Malliyakarai to Rasipuram Section of Road No.4. (SH 79)</b>														
Existing RoW	65	91	123	108	113	73	119	97	115	94	105	105	412	425
Realignment 1	0	-	3	-	3	-	3	-	0	-	4	-	9	-
Realignment 2	1	-	1	-	3	-	11	-	9	-	4	-	4	-
Realignment 3	2	-	10	-	10	-	18	-	9	-	1	-	1	-

<sup>2</sup> Tree details include both government and private trees

Trees coming in	Categorisation of trees based on GBH													
	< 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		>180 cm	
	L	R	L	R	L	R	L	R	L	R	L	R	L	R
Realignment 4	-	1	-	3	-	4	-	4	-	1	-	0	-	1
Realignment 5	1	-	10	-	0	-	3	-	5	-	2	-	1	-
<b>Grand Total</b>														<b>2187</b>
<b>Rasipuram to Tiruchengode Section of Road No.4. (SH 79)</b>														
Existing RoW	276	258	163	122	137	89	186	126	82	37	26	17	30	23
Realignment 6	3	5	0	0	2	1	0	5	0	2	1	2	0	3
Realignment 7	10	1	4	0	1	1	39	6	19	1	4	1	3	0
<b>Grand Total</b>														<b>1686</b>
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>														
Existing RoW	133	123	72	77	51	50	35	51	24	46	29	36	160	180
Realignment 1	0	14	0	6	0	4	0	16	0	3	0	0	0	9
Realignment 2	16	7	2	15	3	1	7	0	3	0	1	0	4	0
<b>Grand Total</b>														<b>1178</b>

#### 7.2.4. Extraction of Materials for Construction Activity

Table 7.4 presents the details of construction material required for the project road upgradation. The quarries for these aggregates and borrow earth are locally available and hence no significant direct impact is envisaged.

Table 7.4. Details of Construction Material Required

Sl No.	Items	Units	Quantity				Sources
			Road No. 2	Sec I of Road No. 4	Sec II of Road No. 4	Road No. 5	
1	Coarse aggregate	Tonnes	289,823.00	388,271.00	244,226.00	170,609.00	Quarry area
2	Sand	Tonnes	7,366.00	21,379.00	7,045.00	11,049.00	Mining area
3	Cement	Tonnes	3,895.00	11,376.00	3,784.00	6,007.00	Plant
4	Bitumen	Tonnes	4,037.00	4,760.00	2,907.00	1,810.00	Plant
5	Steel	Tonnes	692.00	1,939.00	637.00	1,132.00	Plant
6	Diesel	Litres	158,678.00	192,463.00	149,691.00	125,618.00	Refinery
7	Borrow material	Cum	86,110.00	82,400.00	52,828.00	33,407.00	Mining area

#### 7.2.5. Construction Machinery

Table 7.5 below present the quantum of vehicles & machinery required for project intervention and their influence area for each project corridor. These machineries will have its own impacts on surrounding environment especially on air quality subject to emission level of machinery.

Table 7.5. Details of Construction Machinery Required



Sl. No.	Construction Machinery	Quantity (Nos)	Influence area
1	Dumpers	30	Quarry approach and Project road
2	Excavators	10	Quarry sites & Project Road
3	Road Rollers	8	Project road
4	Graders/ Pavers	3	Project Road
5	Stone Crusher /BT Plant	1	Plant site

### 7.2.6. Labours for Construction Activity

Table below presents the number of laborers required/used in the construction activity.

**Table 7.6. Labors for Construction activity**

Sl. No.	Categories	Construction Stage	Operation Stage
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>			
1	Skilled	12	3
2	Semi Skilled	39	9
3	Technicians	8	1
4	Engineers	11	1
5	Managers	8	2
<b>Total</b>		<b>77</b>	<b>15</b>
<b>Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)</b>			
1	Skilled	14	4
2	Semi Skilled	47	11
3	Technicians	9	1
4	Engineers	14	1
5	Managers	9	2
<b>Total</b>		<b>95</b>	<b>19</b>
<b>Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)</b>			
1	Skilled	9	2
2	Semi Skilled	31	7
3	Technicians	6	0
4	Engineers	9	1
5	Managers	6	1
<b>Total</b>		<b>62</b>	<b>12</b>
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>			
1	Skilled	6	2
2	Semi Skilled	21	5
3	Technicians	4	0
4	Engineers	6	0
5	Managers	4	1
<b>Total</b>		<b>41</b>	<b>8</b>

### 7.3. Air Environment – Impacts

Motor vehicles have emerged as one of the major sources of air pollution especially in town area. Due to the proposed road improvements aimed at enhancing the efficiency of road transport system the number of vehicles on these roads will be increased overtime, so impacts on ambient air environment may be significant, which needs detailed analysis.

### **7.3.1. Meteorological Factors and Climate**

#### Construction Phase

Felling of avenue trees, laying of pavement and other construction activity may cause temporary impact on micro climate of the project influence area. Other than this, no other significant impacts are envisaged in climatic parameters such as precipitation, wind speed, wind direction, temperature, relative humidity etc.

#### Operation Phase

The objective of the present project is only to improve the existing road. Hence, no changes in climatic conditions are anticipated.

### **7.3.2. Air Quality – Emissions**

#### Preconstruction Phase

The preconstruction stage activities include site clearance, shifting of utilities, removal of trees present in the corridor of impact (CoI), transportation of man and material, construction of accommodations, construction of stock yards, installation of construction plants, and construction of office buildings. Dust generatig activities would be predominant during pre-construction stage particularly if preconstruction tasks are performed during dry weather.

The impacts due to the preconstruction activity are temporary and location specific and the corridor of impact is limited. Quantification of impacts at the preconstruction stage is very difficult as these are very temporary and localized.

#### Construction Phase

Vehicular emissions are one of the major sources of air quality impacts of road projects. As the project envisages improvement of road conditions for smooth traffic flow, the project will have beneficial impact on air quality of the region during its operation. However, with respect to compliance of ambient air quality standards during the post improvement phase of the road, due to increase in the traffic volume, the impact on air quality along the project corridors is likely to be minor.

Impacts on air quality during the construction phase of the project will be considerable as the amount of work involved in improvement of the roads is significant. However, any possible impacts will be transitory. Provision of adequate air pollution control equipment, like dust filters and measures like dust suppression by water sprinkling and planting of green belt may further help to significantly reduce the impact.

Emission of CO<sub>2</sub> and NO<sub>x</sub> due to combustion of diesel from vehicles, hot mix plant, batch mix plant, diesel generator sets etc. will be a principal cause of air pollution during the construction phase. The data on fuel utilization rates of units likely to be in operation during the road improvement are provided in **Table 7.7**.

**Table 7.7. Fuel Consumption Rates for Construction Machinery**

Machines	Fuel Consumption (Litres/hour)
Cement concrete mixer	7
Truck	8
Bulldozer	20
Grader	12
Roller	20
Dumpers & Tippers	18
Water Tanker	8
Paver	12

Source: Indian Institute of Petroleum

Due to ground level temperature inversion at site during winter months, meteorological conditions after the sunset tend to become stable. The overall meteorological parameters thus constitute adverse conditions for dispersion of ground based air pollution emissions. Under adverse meteorological conditions, it may be possible that the NO<sub>x</sub> standards (80 µg/m<sup>3</sup> for 24 hourly averages) may be violated only if the construction work is carried out round the clock. However, this scenario is not envisaged, as the construction is not proposed to be carried out round the clock.

Fugitive dust generation due to operations such as excavation of construction materials in borrow and quarry areas, loading, transportation and unloading of construction materials, cutting and drilling of rock masses and dust due to other construction activities. Fugitive dust released during above activities may cause immediate effect on construction workers, and people residing along the alignments especially those in downward wind direction. Most of the generated pollutants due to these construction activities are limited to construction phase and confined to impact zone.

#### Operation Phase

After improvement of the existing road, the traffic is expected to move smoothly at higher designed speed, which will ensure lower emissions of gaseous pollutants. This will further improve air quality in the region and hence, the project is not expected to affect the air quality adversely. The rate of emissions of various types of vehicles is presented in **Table 7.8**. However, the extent of these impacts, at any given point of time will depend upon the rate of vehicular emission within a given stretch of the road; and the prevailing meteorological conditions. The impacts will have strong temporal dependence as both of these factors vary with time. The temporal dependence would have diurnal, seasonal as well as long-term components.

**Table 7.8. Rate of Emissions of Various Types of Vehicles**

Emissions	Emission Factors in gm/Km/Vehicle					
<b>1. For Diesel Vehicles</b>						
	Speed (Km/hr)					
	30	40	50	60	70	80
CO	12.53	9.40	7.52	6.27	5.37	4.70
NO <sub>x</sub>	22.28	16.71	13.37	11.14	9.55	8.36
<b>2. For Petrol Vehicles</b>						
	Vehicles					
	Car	2 Wheeler	3 Wheeler			
CO	2.72	2.0	4.0			
NO <sub>x</sub>	0.58	0.5	0.5			

Source: Indian Institute of Petroleum

## 7.4. Land Environment – Impacts

### 7.4.1. Impacts on Topography

#### Construction Phase

In rolling terrain, cutting and leveling will alter the existing topography. In case of hilly terrain cutting of hill sections is required, which can alter the existing topography to a greater extent. Construction of embankments results in alteration of geography of the area. Removal of soil and earth strata at bridge approaches will cause changes in topography. Further, extraction of construction materials from selected borrow area, quarry location and sand mining areas will alter the terrain, affects the aesthetics of landscape and alters the contours of the geographical region. The overall topography of the area is not going to alter due to these minor changes providing positive impacts. List of embankment raising sections are listed in **Table 7.11**.

**Table 7.9. List of Embankment Raising Sections**

Sl. No.	Design Chainage		Length of raising section (m)	Reason for raising
	From	To		
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>				
No new retaining wall or high raised embankments are proposed in this project corridor				
<b>Section I – Malliyakarai – Rasipuram Section of Road No. 4 (SH79)</b>				
No new retaining wall or high raised embankments are proposed in this project corridor				
<b>Section II –Rasipuram – Tiruchengode Section of Road No. 4 (SH79)</b>				
1	61+930	62+060	130	Realignment
<b>Mohanur to Namakkal Section of Road No. 5 (SH 95)</b>				
1	2+070	2+440	2.5	Realignment with new minor bridge proposed
2	4+900	5+020	1	Correcting the existing vertical profile
3	6+630	6+880	1	Realignment

#### Operational Phase

No significant impact is envisaged on topography during operation phase.

### 7.4.2. Impacts on Geology

Likely impact on the geological resources will occur from the extraction of materials (borrow of earth, granular sub base and aggregate for base course and bridges). These materials will be procured from the authorized suppliers and prevalent rules will be followed for borrowing soil, sand and aggregates. Hence, the impacts on general geology of the region are insignificant. At the construction sites, no blasting is proposed, therefore, there will be no added impact on the geology of the area.

### 7.4.3. Impacts on Seismology

The construction and operation of the project roads will not lead to any adverse impact on seismology setting of the regional environment. On the contrary, the seismic events that could occur on the region could damage the road and structures if not constructed as per the specification recommended for the seismic zone. Present upgradation will incorporate both, existing structures will be checked & compiled and new structures will be designed earthquake resistant. Project roads falls under zone II & zone III, i.e. least to moderate active categories as per the seismic zone classification of India.

#### **7.4.4. Impacts on Lands**

**Loss of land:** One of the major ‘local’ impacts due to highway project is upon the local land resources required for widening and improvement of the project road. There are stretches along the corridors where acquisition of agricultural land has been unavoidable due to non-availability of sufficient right of way to accommodate the proposed cross section.

**Generation of Debris:** The major source of debris generation is dismantling of existing cross drainage structures and road side residential and commercial structures.

**Soil Erosion:** Erosion of topsoil can be considered a moderate, direct and long-term negative impact resulting from the construction and maintenance of roads. The potential for soil erosion is high during the construction stage. Starting with clearing and grubbing of vegetation is exposing raw soil for erosion. The construction of new fill slopes for grading and bridge-end fills also exposes large areas to erosion, if protection methods are not implemented. Finally, during the operation or maintenance phase of highway development, erosion can continue to occur in areas not vegetated. Fills are exposed to long-term exposure to water and wind. Although soil erosion occurs sporadically on highway corridors, the sites most affected are generally bridge approaches, fills and over-steep banks.

#### **Road Slopes and Spoils**

Erosion problems may occur on newly constructed slopes and fills depending on soil type, angle of slope, height of slope and climatic factors like wind (direction, speed and frequency) and rain (intensity and duration). Since slope protection methods (re-vegetation or stone pitching) form part of good engineering practice, and have been incorporated into the detailed design for the roads, erosion concerns should be minimised. However, failure to maintain soil erosion protection can reduce the security of high road embankments and add siltation to the rivers during the monsoon season.

#### **Construction of new Bridges and Culverts**

Along each corridor rehabilitation / reconstruction / widening of a number of major and minor bridges and culverts is planned. Construction of new bridges involves excavation of river bed and banks for the construction of the foundation and piers. If the residual spoil is not properly disposed off, increased sedimentation downstream of the bridge may take place during the monsoon. Also, the bridge approaches fills require armouring to ensure gullying and slumping are minimised.

During the construction period some amount of drainage alteration and downstream erosion / siltation is anticipated. Some of these alterations may be because of construction of temporary traffic detours / diversion. Except for these temporary works, in almost all cases there should be an improvement in the drainage characteristics of the surrounding area due to improved design and added culvert / ditch capacity. Changes in the drainage pattern due to the raising of the road profile has not been discussed in specific cases, as the likely impact is not adverse and does not warrant mitigation (as the road design itself takes care of cross-pavement drainage). New culverts are being incorporated in the project roads not only to prevent over-topping but also to maintain equal water distribution on either side of the road. In fact, the bridges and culverts, as designed, are an automatic enhancement to the local environment (flooding, stagnation, scour, torrent run-off velocity – all would be reduced as a result of this project).

## Quarries and Borrow Areas

The excavation of quarries and borrow pits used for obtaining soil and aggregate materials for road construction can cause direct and indirect long-term major adverse impacts on the environment. While loss of productive soil is the most direct negative impact, other significant indirect negative impacts can also occur.

Since most of the construction materials would be available from existing quarries nearby, relatively few new borrow areas will be required.

One of the long-term residual adverse impacts of borrow pits not reclaimed is the spread of malaria. Mosquitoes breeding and multiplying in stagnant water that collects in these pits can affect humans in villages and towns close to the features.

### 7.4.5. Contamination of Soil

#### Construction Phase

Soil contamination would take place to a small extent due to spillage of construction material, oil, fuel, grease and asphalt around the construction yards. Especially at vehicle & DG sets fueling areas, where soil contamination occurs predominantly. Dumping of scarified materials to the adjacent agricultural land may lead to contamination of top soil. Leachates of the scarified asphalt material can spoil the soil quality to a marginal depth. Disposal of construction waste and domestic waste in unscientific way may result in loss of productive land.

#### Operational Phase

Better access can lead to conversion of agricultural land to commercial and residential purpose close to project road, especially in rural areas. This may result in loss of productive land and agriculture produce. Erosion of embankment formation may occur near low lying areas and near bridge approaches, during monsoon. Deterioration of borrow areas may happen if not rehabilitated properly.

## 7.5. Water Environment – Impacts

Due to the proposed project, there will be some direct and indirect long-term impacts on the water resources. Table below presents the major adverse impacts on the water resources and the indicators chosen to assess the impacts for the study.

**Table 7.10A. Impacts on Water Resources Due to Construction Activities**

Impacts Due To Construction	Indicators
Loss of water bodies	Area of water bodies affected
Loss of other water supply sources	Number of wells affected
Alteration of drainage, run off, flooding	No. of cross drainage channels
Depletion of Ground Water recharge	Area rendered impervious
Use of Water Supply for Construction	Quantum of water used
Contamination from fuel and lubricants	Nature and quantum of contaminants
Contamination from improper sanitation and Waste Disposal in Construction Camps	Area of camp / disposal site and, proximity to water bodies / channels

## 7.5.1. Loss of Water Bodies

The project road passes through the dry area of Tamil Nadu with mean average rainfall of 600 – 1600 mm. Due to non-availability of water, many farmers along the project corridors are practicing seasonal cultivation.

### 7.5.1.1. Surface Water

#### Construction Phase




The project roads are crossing rivers, canals and streams on its way and are abutting ponds and tanks, wells, bore wells, etc. Disposal of construction debris near the vicinity of water bodies may cause stagnation / diversion of natural drainage. Water supply units present adjacent to project road within the proposed RoW will be impacted. **Table 7.12B** and **Table 8.2** present the details of the existing surface water resources and the possible impacts due to project. Drawing of water for construction camps for domestic use from local water sources may disturb water supply use for the local inhabitants. Construction activity at bridge and culvert locations may cause water pollution.

#### Operation Phase

Lack of proper drainage arrangement may result in soil erosion subsequently leads to turbidity and siltation of nearby natural water bodies. Spillage of edible oil, crude oil, lubricants and other hazardous chemical due to road accidents close to natural drainage will lead to change in water quality. Unscientific disposal of debris and construction materials in low laying area shall lead to flooding during rainy season. Water shall be utilised for maintenance of trees planted along project road.

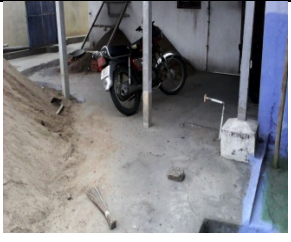

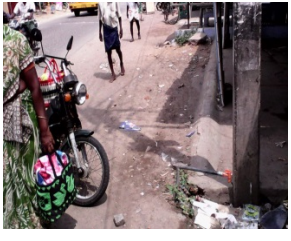






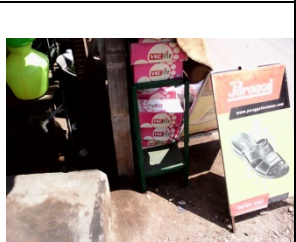


**Table 7.12B: Impact on Surface Water Bodies**

#### Tiruchengode to Paramathy Section of Road No. 2 (SH 86)

Chainage (km)	57+080		57+100	
Structure ID No	TR-PA-WTP-01		TR-PA-WT-01	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.161m)		Eccentric on RHS (11.623m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+170		57+160	
Structure ID No	TR-PA-WTP-02		Water Tap	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7m		6m	
Length x Breadth			NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.368m)		Eccentric on RHS (11.6m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		Abandoned	
Chainage (km)	57+240		57+300	
Structure ID No	TR-PA-WTP-03		TR-PA-WTP-04	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5m		7m	





Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.5m)		Eccentric on LHS (12.304m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+400		57+710	
Structure ID No	TR-PA-WT-02		TR-PA-WTP-05	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (14.768m)		Eccentric on LHS (12.088m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+730		57+770	
Structure ID No	TR-PA-WTP-06		TR-PA-WTP-07	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.827m)		Eccentric on LHS (11.5m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+800		58+000	
Structure ID No	TR-PA-WTP-08		TR-PA-WTP-09	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.5m)		Eccentric on LHS (11.5m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	58+200		58+250	
Structure ID No	TR-PA-WTP-10		TR-PA-WTP-11	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.5m)		Eccentric on LHS (12.084m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	56+280		59+180	
Structure ID No	TR-PA-WTP-12		TR-PA-WTP-13	
Village Name	Pudupuliyampatti		Chittalandhur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.082m)		Widening towards RHS (11.956m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	59+560		59+680	
Structure ID No	TR-PA-WTP-14		TR-PA-WTP-15	
Village Name	Chittalandhur		Chittalandhur	



Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.238m)		Eccentric on RHS (8.086m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	59+755		59+860	
Structure ID No	TR-PA-WTP-16		TR-PA-WTP-17	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.242m)		Widening towards LHS (6.913m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	59+870		59+890	
Structure ID No	TR-PA-WTP-18		TR-PA-WTP-19	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (6.544m)		Widening towards LHS (5.897m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	60+470		60+500	
Structure ID No	TR-PA-WT-03		TR-PA-WTP-20	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	8m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.608m)		Eccentric on RHS (11.626m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	63+570		65+340	
Structure ID No	Tr-PA-WTP-21		TR-PA-WTP-22	
Village Name	Maniyampur		Nallur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	9m		9m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (7.935m)		Widening towards LHS (9.569m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	65+340		65+350	
Structure ID No	TR-PA-WTP- 23		TR-PA-WTP-24	
Village Name	Nallur		Nallur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	8m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.475m)		Widening towards LHS (9.527m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	65+350		65+360	

Structure ID No	TR-PA-WTP-25		TR-PA-WTP-26	
Village Name	Nallur		Nallur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.509m)		Widening towards LHS (9.541m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-	-		
Chainage (km)	65+360	65+380		
Structure ID No	TR-PA-WTP-27	TR-PA-WTP-28		
Village Name	Nallur	Nallur		
Side (Left/Right)	Right Side	Left Side		
Distance from ECL	7m	8m		
Length x Breadth	NA	NA		
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.541m)	Widening towards LHS (9.556m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	65+380	65+700		
Structure ID No	TR-PA-WTP-29	TR-PA-WTP-30		
Village Name	Nallur	Nallur		
Side (Left/Right)	Right Side	Right Side		
Distance from ECL	7m	12m		
Length x Breadth	NA	NA		
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.457m)	Widening towards RHS (9.366m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	65+720	65+790		
Structure ID No	TR-PA-WTP-31	TR-PA-WTP-32		
Village Name	Nallur	Nallur		
Side (Left/Right)	Right Side	Right Side		
Distance from ECL	9m	9m		
Length x Breadth	NA	NA		
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.368m)	Widening towards RHS (9.781m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	65+800	66+200		
Structure ID No	TR-PA-WT-04	Water Tank		
Village Name	Nallur	Nallur		
Side (Left/Right)	Right Side	Left Side		
Distance from ECL	7m	7m		
Length x Breadth	NA	NA		
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.701m)	Widening towards LHS (8.399m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	Abandoned		
Chainage (km)	68+060	68+100		
Structure ID No	TR-PA-WTP-33	TR-PA-WTP-34		
Village Name	Nallur	Nallur		
Side (Left/Right)	Left Side	Left Side		
Distance from ECL	6m	6m		
Length x Breadth	NA	NA		
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (10.351m)	Widening towards LHS (9.015m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		

Chainage (km)	68+150		69+380	
Structure ID No	Water Tank		TR-PA-WTP-35	
Village Name	Nallur		Nallur	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (7.916m)		Widening towards LHS (14.304m)	
Ownership			Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		-	
Chainage (km)	69+450		70+100	
Structure ID No	TR-PA-OHT-01		TR-PA-WTP-36	
Village Name	Nallur		Kunnamalai	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	15		9m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (12.561m)		Eccentric on LHS (8.240m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	71+650		72+040	
Structure ID No	TR-PA-WT-05		Water Tap	
Village Name	Ramadevam		Melsathambur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7m		10m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.630m)		Widening towards LHS (11.158m)	
Ownership	Government			
Impact	Direct Impact		Direct Impact	
Remarks	-		Abandoned	
Chainage (km)	73+160		74+450	
Structure ID No	Water Tap		TR-PA-WTP-37	
Village Name	Melsathambur		Kudacheri	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	10m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.037m)		Eccentric on LHS (12.662m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		-	
Chainage (km)	74+500		79+380	
Structure ID No	TR-PA-WTP-38		TR-PA-WTP-39	
Village Name	Kudacheri		Paramathi	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (8.603m)		Eccentric on RHS (8.189m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	79+430		79+450	
Structure ID No	TR-PA-WTP-40		TR-PA-WTP-41	
Village Name	Paramathi		Paramathi	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	8m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (7.952m)		Eccentric on LHS (8.616m)	

Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	79+450		79+900	
Structure ID No	TR-PA-WT-06		TR-PA-WTP-42	
Village Name	Paramathi		Paramathi	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	15		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (7.400m)		Eccentric on RHS (8.079m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	

### Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)

Chainage (km)	0+300		1+620	
Structure ID No	MK-RP/WT1		MK-RP/WT2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.587 m)		Eccentric on RHS (11.8 m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	2+000		2+020	
Structure ID No	MK-RP/WP1		MK-RP/WP2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5.5 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (10.74 m)		Widening towards RHS (10.37m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	2+140		2+160	
Structure ID No	MK-RP/WP2		MK-RP/WP4	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (10.12m)		Widening towards RHS (9.53m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	4+120		4+135	
Structure ID No	MK-RP/WP5		MK-RP/WP6	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.92m)		Eccentric on LHS (11.915m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

Chainage (km)	4+410		4+520	
Structure ID No	MK-RP/WP3		MK-RP/WP7	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.8m)		Eccentric on LHS (8.17 m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		Remarks	
Chainage (km)	4+580		4+580	
Structure ID No	MK-RP/WP8		MK-RP/WP9	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7 m		4 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.12 m)		Eccentric on RHS (8.87m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	4+600		4+610	
Structure ID No	MK-RP/WP10		MK-RP/WP10	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.256 m)		Widening towards LHS (7.4m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		Abandoned	
Chainage (km)	4+620		4+650	
Structure ID No	MK-RP/WP11		MK-RP/WP12	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7.5 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.71m)		Eccentric on LHS (8.82 m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		Abandoned	
Chainage (km)	4+700		5+990	
Structure ID No	MK-RP/WP13		MK-RP/WP14	
Village Name	Gopalapuram		Thimmanayakapatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		8 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.53 m)		Eccentric on RHS (12.46m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	6+200		6+250	
Structure ID No	MK-RP/WP16		MK-RP/WP14	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	8 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (12.41m)		Widening towards RHS (7.27m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

Chainage (km)	6+270		6+500	
Structure ID No	MK-RP/WP15		MK-RP/WP17	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8 m		7.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.44m)		Widening towards RHS (6.98m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	6+580		6+590	
Structure ID No	MK-RP/WP18		MK-RP/WP19	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	8 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.89m)		Widening towards LHS (7.97m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	6+700		6+740	
Structure ID No	MK-RP/WP20		MK-RP/WP21	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (11.53m)		Widening towards RHS (11.49m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks		Abandoned		
Chainage (km)	7+200		7+650	
Structure ID No	MK-RP/WP22		MK-RP/WP23	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	8 m		7.5 cm	
Length x Breadth				
Proposed Widening	Eccentric on RHS (11.53m)		Widening towards LHS (10.86m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	7+760		8+050	
Structure ID No	MK-RP/WP24		MK-RP/WP25	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7 m		10 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (10.61m)		Eccentric on LHS (13.21m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks		Abandoned		
Chainage (km)	8+060		8+060	
Structure ID No	MK-RP/WP25		MK-RP/WP26	
Village Name	Thimmanayakapatti		Thimmanayakapatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	8 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (13.34m)		Widening towards RHS (9.65m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				

Chainage (km)	8+680		9+170	
Structure ID No	MK-RP/WP27		MK-RP/WP28	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (13.23m)		Widening towards LHS (9.05m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	9+180		9+190	
Structure ID No	MK-RP/WP29		MK-RP/WP30	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (8.633m)		Widening towards LHS (8.408m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	9+330		9+340	
Structure ID No	MK-RP/WP31		MK-RP/WP32	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (10.636m)		Widening towards LHS (10.578m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	9+350		9+420	
Structure ID No	MK-RP/WT6		MK-RP/WP32	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (10.641m)		Eccentric on LHS (14.38m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	9+590		9+650	
Structure ID No	MK-RP/WP33		MK-RP/WP34	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (11.07m)		Widening towards LHS (9.37m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	10+200		11+000	
Structure ID No	MK-RP/WT8		MK-RP/WT10	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7 m		10 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (14.397m)		Eccentric on LHS (14.77m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				













Chainage (km)	11+250		11+600	
Structure ID No	MK-RP/WT11		MK-RP/WT12	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5.5 m		10 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (14.015m)		Eccentric on LHS (12.476m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	11+910		11+920	
Structure ID No	MK-RP/WP35		MK-RP/WP36	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5.5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.94m)		Widening towards LHS (7.76m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	11+950		11+950	
Structure ID No	MK-RP/WP37		MK-RP/WP38	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		5.5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.98m)		Eccentric on RHS (8.01m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+000		12+045	
Structure ID No	MK-RP/WP39		MK-RP/WP40	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		4 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.892m)		Eccentric on RHS (9.03m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+050		12+070	
Structure ID No	MK-RP/WP41		MK-RP/WP42	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	4 m		4.5 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (9.03m)		Widening towards LHS (7.06m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+080		12+080	
Structure ID No	MK-RP/WP43		MK-RP/WP44	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5.5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.25m)		Eccentric on RHS (8.74m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				















Chainage (km)	12+090		12+100	
Structure ID No	MK-RP/WP45		MK-RP/WP46	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.49m)		Eccentric on RHS (8.17m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+100		12+100	
Structure ID No	MK-RP/WP47		MK-RP/WP49	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	4.5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.84 m)		Widening towards LHS (7.84m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+110			
Structure ID No	MK-RP/WP49			
Village Name	Iswaramurthipalayam			
Side (Left/Right)	Left Side			
Distance from ECL	5 m			
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.25m)			
Ownership	Government			
Impact	Direct Impact			
Remarks				
Chainage (km)	12+130		12+130	
Structure ID No	MK-RP/WP50		MK-RP/WP51	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (9.1m)		Widening towards RHS (6.91m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+140		12+150	
Structure ID No	MK-RP/WP52		MK-RP/WP53	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5 m		5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (9.61m)		Eccentric on LHS (9.73m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	12+160		12+160	
Structure ID No	MK-RP/WP54		MK-RP/WP55	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5.5 m		5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (9.85m)		Widening towards RHS (6.14m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

Chainage (km)	12+165		12+170	
Structure ID No	MK-RP/WP56		MK-RP/WP57	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5.5 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (10.05m)		Widening towards RHS (5.94m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+200		12+200	
Structure ID No	MK-RP/WP58		MK-RP/WP59	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5.5 m		4 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (9.63m)		Widening towards RHS (6.37m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+230		12+250	
Structure ID No	MK-RP/WP60		MK-RP/WP61	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	4 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.32m)		Widening towards RHS (7.78m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+255		12+265	
Structure ID No	MK-RP/WP62		MK-RP/WT13	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.94m)		Widening towards LHS (7.96m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+310		12+580	
Structure ID No	MK-RP/WP63		MK-RP/WP64	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.73m)		Eccentric on LHS (11.43m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	14+070		14+100	
Structure ID No	MK-RP/WP65		MK-RP/WP66	
Village Name	Mangalapuram		Mangalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7.5 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (12.54m)		Widening towards LHS (7.46m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				

Chainage (km)	14+120		15+150	
Structure ID No	MK-RP/WP67		MK-RP/WP69	
Village Name	Mangalapuram		Mangalapuram	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7.5 m		7.5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (5.66m)		Widening towards RHS (7.73m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	15+170		15+300	
Structure ID No	MK-RP/WP68		MK-RP/WP70	
Village Name	Mangalapuram		Mangalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7.5 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.045m)		Widening towards LHS (11.16m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	15+320		15+410	
Structure ID No	MK-RP/WP71		MK-RP/WP72	
Village Name	Mangalapuram		Mangalapuram	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	6.5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (11.11m)		Eccentric on RHS (11.56m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	17+650		17+680	
Structure ID No	MK-RP/WP15		MK-RP/WP73	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (11.13m)		Eccentric on RHS (9.34m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	17+790		17+815	
Structure ID No	MK-RP/WP74		MK-RP/WP75	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.685m)		Widening towards RHS (7.88m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	17+825		17+920	
Structure ID No	MK-RP/WP76		MK-RP/WP77	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	8.5 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.43m)		Eccentric on LHS (8.59m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			



Chainage (km)	17+970		18+020	
Structure ID No	MK-RP/WT16		MK-RP/WT78	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.9m)		Widening towards LHS (11.61m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	18+375		18+645	
Structure ID No	MK-RP/WT79		MK-RP/WT80	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6.5 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.07m)		Widening towards LHS (5.97m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	18+790		18+820	
Structure ID No	MK-RP/WT81		MK-RP/WT82	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.35m)		Eccentric on LHS (8.2m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	19+005		19+020	
Structure ID No	MK-RP/WT83		MK-RP/WT84	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6.5 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.16m)		Widening towards LHS (10.55m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	19+205		19+420	
Structure ID No	MK-RP/WT85		MK-RP/WT86	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6.5 m		5.5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (10.95m)		Widening towards LHS (9.435m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	19+520		19+540	
Structure ID No	MK-RP/WT87		MK-RP/WT88	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5.5 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.646m)		Eccentric on LHS (11.728m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				













Chainage (km)	19+560		19+750	
Structure ID No	MK-RP/WP89		MK-RP/WP90	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7.5 m		8 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.765m)		Eccentric on LHS (11.68m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	20+620		20+660	
Structure ID No	MK-RP/WP91		MK-RP/WT17	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8.5 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.529m)		Eccentric on RHS (11.9m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	20+725		20+760	
Structure ID No	MK-RP/WP92		MK-RP/WP93	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8 m		5 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (20.812m)		Eccentric on RHS (15.709m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	21+500		21+600	
Structure ID No	MK-RP/WP94		MK-RP/WT18	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.422m)		Eccentric on RHS (8.747m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	21+700		21+710	
Structure ID No	MK-RP/WP95		MK-RP/WP96	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		8.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.075m)		Widening towards RHS (6.914m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	21+720		21+730	
Structure ID No	MK-RP/WP97		MK-RP/WP98	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7.5 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (6.961m)		Widening towards RHS (7.059m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				

Chainage (km)	21+740		21+750	
Structure ID No	MK-RP/WP99		MK-RP/WP100	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.134m)		Widening towards RHS (7.263m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+760		21+770	
Structure ID No	MK-RP/WP101		MK-RP/WP102	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6.5 m		6.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.39m)		Widening towards RHS (7.517m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+780		21+790	
Structure ID No	MK-RP/WP103		MK-RP/WP104	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6.5 m		6.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.643m)		Widening towards RHS (7.769m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+800		21+810	
Structure ID No	MK-RP/WP105		MK-RP/WP106	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5.5 m		6.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.845m)		Widening towards RHS (7.881m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+820		21+950	
Structure ID No	MK-RP/WP107		MK-RP/WP109	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8 m		6.5	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.91m)		Widening towards RHS (14.138m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	24+940		25+007	
Structure ID No	MK-RP/WP108		MK-RP/WP109	
Village Name	Moolapallipatti		Moolapallipatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.4m)		Widening towards RHS (5.87m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

Chainage (km)	27+250		28+550	
Structure ID No	MK-RP/WP110		MK-RP/WP111	
Village Name	Namagiripettai		Namagiripettai	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	6.5 m		5.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.05m)		Widening towards RHS (7.883m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	28+600		28+620	
Structure ID No	MK-RP/WP112		MK-RP/WP113	
Village Name	Namagiripettai		Namagiripettai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		5.5 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.296m)		Eccentric on RHS (8.427m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	28+750		28+760	
Structure ID No	MK-RP/WP114		MK-RP/WP115	
Village Name	Namagiripettai		Namagiripettai	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (11.033m)		Eccentric on LHS (8.128m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	29+170			
Structure ID No	MK-RP/WP116			
Village Name	Namagiripettai			
Side (Left/Right)	Right Side			
Distance from ECL	7 m			
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.088m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	Abandoned			

### Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

Chainage (km)	0+300		1+620	
Structure ID No	MK-RP/WT1		MK-RP/WT2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.587 m)		Eccentric on RHS (11.8 m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	2+000		2+020	
Structure ID No	MK-RP/WP1		MK-RP/WP2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5.5 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (10.74 m)		Widening towards RHS (10.37m)	
Ownership				
Impact				
Remarks				

Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned			
Chainage (km)	2+140		2+160	
Structure ID No	MK-RP/WP2		MK-RP/WP4	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		8 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (10.12m)		Widening towards RHS (9.53m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	4+120		4+135	
Structure ID No	MK-RP/WP5		MK-RP/WP6	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.92m)		Eccentric on LHS (11.915m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	4+410		4+520	
Structure ID No	MK-RP/WT3		MK-RP/WP7	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		6 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.8m)		Eccentric on LHS (8.17 m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		Remarks	
Chainage (km)	4+580		4+580	
Structure ID No	MK-RP/WP8		MK-RP/WP9	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7 m		4 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.12 m)		Eccentric on RHS (8.87m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	4+600		4+610	
Structure ID No	MK-RP/WP10		MK-RP/WP10	
Village Name	Gopalapuram		Gopalapuram	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.256 m)		Widening towards LHS (7.4m)	
Ownership	Government		Government	



<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Abandoned		Abandoned	
<b>Chainage (km)</b>	4+620		4+650	
<b>Structure ID No</b>	MK-RP/WP11		MK-RP/WP12	
<b>Village Name</b>	Gopalapuram		Gopalapuram	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	7.5 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (7.71m)		Eccentric on LHS (8.82 m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Abandoned		Abandoned	
<b>Chainage (km)</b>	4+700		5+990	
<b>Structure ID No</b>	MK-RP/WP13		MK-RP/WT4	
<b>Village Name</b>	Gopalapuram		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5 m		8 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (11.53 m)		Eccentric on RHS (12.46m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	6+200		6+250	
<b>Structure ID No</b>	MK-RP/WP16		MK-RP/WP14	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	8 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (12.41m)		Widening towards RHS (7.27m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	6+270		6+500	
<b>Structure ID No</b>	MK-RP/WP15		MK-RP/WP17	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	8 m		7.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.44m)		Widening towards RHS (6.98m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	6+580		6+590	
<b>Structure ID No</b>	MK-RP/WP18		MK-RP/WP19	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	8 m		8 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (7.89m)		Widening towards LHS (7.97m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	6+700		6+740	
<b>Structure ID No</b>	MK-RP/WP20		MK-RP/WP21	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	7 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on RHS (11.53m)		Widening towards RHS (11.49m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>				
<b>Remarks</b>				






<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>			Abandoned	
<b>Chainage (km)</b>	7+200		7+650	
<b>Structure ID No</b>	MK-RP/WP22		MK-RP/WP23	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	8 m		7.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on RHS (11.53m)		Widening towards LHS (10.86m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	7+760		8+050	
<b>Structure ID No</b>	MK-RP/WP24		MK-RP/WP25	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	7 m		10 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (10.61m)		Eccentric on LHS (13.21m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>			Abandoned	
<b>Chainage (km)</b>	8+060		8+060	
<b>Structure ID No</b>	MK-RP/WP25		MK-RP/WP26	
<b>Village Name</b>	Thimmanayakapatti		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	8 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (13.34m)		Widening towards RHS (9.65m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	8+680		9+170	
<b>Structure ID No</b>	MK-RP/WP27		MK-RP/WP28	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	6 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (13.23m)		Widening towards LHS (9.05m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	9+180		9+190	
<b>Structure ID No</b>	MK-RP/WP29		MK-RP/WP30	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	6 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (8.633m)		Widening towards LHS (8.408m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	9+330		9+340	
<b>Structure ID No</b>	MK-RP/WP31		MK-RP/WP32	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	6 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (10.636m)		Widening towards LHS (10.578m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>				
<b>Remarks</b>				













Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	9+350		9+420	
Structure ID No	MK-RP/WT6		MK-RP/WP32	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (10.641m)		Eccentric on LHS (14.38m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	9+590		9+650	
Structure ID No	MK-RP/WP33		MK-RP/WP34	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (11.07m)		Widening towards LHS (9.37m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	10+200		11+000	
Structure ID No	MK-RP/WT8		MK-RP/WT10	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7 m		10 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (14.397m)		Eccentric on LHS (14.77m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	11+250		11+600	
Structure ID No	MK-RP/WT11		MK-RP/WT12	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5.5 m		10 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (14.015m)		Eccentric on LHS (12.476m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	11+910		11+920	
Structure ID No	MK-RP/WP35		MK-RP/WP36	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5.5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.94m)		Widening towards LHS (7.76m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	11+950		11+950	
Structure ID No	MK-RP/WP37		MK-RP/WP38	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		5.5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.98m)		Eccentric on RHS (8.01m)	
Ownership	Government		Government	
Impact				
Remarks				

Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	12+000		12+045	
Structure ID No	MK-RP/WP39		MK-RP/WP40	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		4 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.892m)		Eccentric on RHS (9.03m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+050		12+070	
Structure ID No	MK-RP/WP41		MK-RP/WP42	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	4 m		4.5 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (9.03m)		Widening towards LHS (7.06m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+080		12+080	
Structure ID No	MK-RP/WP43		MK-RP/WP44	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5.5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.25m)		Eccentric on RHS (8.74m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+090		12+100	
Structure ID No	MK-RP/WP45		MK-RP/WP46	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.49m)		Eccentric on RHS (8.17m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+100		12+100	
Structure ID No	MK-RP/WP47		MK-RP/WP49	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	4.5 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards LHS (7.84 m)		Widening towards LHS (7.84m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	12+110			
Structure ID No	MK-RP/WP49			
Village Name	Iswaramurthipalayam			
Side (Left/Right)	Left Side			
Distance from ECL	5 m			
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.25m)			
Ownership	Government			
Impact				
Remarks				








<b>Impact</b>	Direct Impact			
<b>Remarks</b>				
<b>Chainage (km)</b>	12+130		12+130	
<b>Structure ID No</b>	MK-RP/WP50		MK-RP/WP51	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (9.1m)		Widening towards RHS (6.91m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+140		12+150	
<b>Structure ID No</b>	MK-RP/WP52		MK-RP/WP53	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	5 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (9.61m)		Eccentric on LHS (9.73m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Abandoned			
<b>Chainage (km)</b>	12+160		12+160	
<b>Structure ID No</b>	MK-RP/WP54		MK-RP/WP55	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5.5 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (9.85m)		Widening towards RHS (6.14m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+165		12+170	
<b>Structure ID No</b>	MK-RP/WP56		MK-RP/WP57	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5.5 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (10.05m)		Widening towards RHS (5.94m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+200		12+200	
<b>Structure ID No</b>	MK-RP/WP58		MK-RP/WP59	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5.5 m		4 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (9.63m)		Widening towards RHS (6.37m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+230		12+250	
<b>Structure ID No</b>	MK-RP/WP60		MK-RP/WP61	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	4 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.32m)		Widening towards RHS (7.78m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>				
<b>Remarks</b>				

<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+255		12+265	
<b>Structure ID No</b>	MK-RP/WP62		MK-RP/WT13	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	5 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.94m)		Widening towards LHS (7.96m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+310		12+580	
<b>Structure ID No</b>	MK-RP/WP63		MK-RP/WP64	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	7 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.73m)		Eccentric on LHS (11.43m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>				
<b>Chainage (km)</b>	14+070		14+100	
<b>Structure ID No</b>	MK-RP/WP65		MK-RP/WP66	
<b>Village Name</b>	Mangalapuram		Mangalapuram	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	7.5 m		7.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (12.54m)		Widening towards LHS (7.46m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>				
<b>Chainage (km)</b>	14+120		15+150	
<b>Structure ID No</b>	MK-RP/WP67		MK-RP/WP69	
<b>Village Name</b>	Mangalapuram		Mangalapuram	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	7.5 m		7.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (5.66m)		Widening towards RHS (7.73m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>				
<b>Chainage (km)</b>	15+170		15+300	
<b>Structure ID No</b>	MK-RP/WP68		MK-RP/WP70	
<b>Village Name</b>	Mangalapuram		Mangalapuram	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	7.5 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (8.045m)		Widening towards LHS (11.16m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>	Abandoned			
<b>Chainage (km)</b>	15+320		15+410	
<b>Structure ID No</b>	MK-RP/WP71		MK-RP/WP72	
<b>Village Name</b>	Mangalapuram		Mangalapuram	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	6.5 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (11.11m)		Eccentric on RHS (11.56m)	
<b>Ownership</b>	Government		Government	

Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	17+650		17+680	
Structure ID No	MK-RP/WT15		MK-RP/WP73	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (11.13m)		Eccentric on RHS (9.34m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks	Abandoned			
Chainage (km)	17+790		17+815	
Structure ID No	MK-RP/WP74		MK-RP/WP75	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.685m)		Widening towards RHS (7.88m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	17+825		17+920	
Structure ID No	MK-RP/WP76		MK-RP/WP77	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	8.5 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.43m)		Eccentric on LHS (8.59m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks	Abandoned			
Chainage (km)	17+970		18+020	
Structure ID No	MK-RP/WT16		MK-RP/WP78	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7 m		6 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.9m)		Widening towards LHS (11.61m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	18+375		18+645	
Structure ID No	MK-RP/WP79		MK-RP/WP80	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6.5 m		7 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.07m)		Widening towards LHS (5.97m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	18+790		18+820	
Structure ID No	MK-RP/WP81		MK-RP/WP82	
Village Name	Ayilpatti		Ayilpatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6 m		7.5 m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (8.35m)		Eccentric on LHS (8.2m)	
Ownership	Government		Government	

<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Abandoned			
<b>Chainage (km)</b>	19+005		19+020	
<b>Structure ID No</b>	MK-RP/WP83		MK-RP/WP84	
<b>Village Name</b>	Ayilpatti		Ayilpatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	6.5 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (8.16m)		Widening towards LHS (10.55m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	19+205		19+420	
<b>Structure ID No</b>	MK-RP/WP85		MK-RP/WP86	
<b>Village Name</b>	Ayilpatti		Ayilpatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	6.5 m		5.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards LHS (10.95m)		Widening towards LHS (9.435m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	19+520		19+540	
<b>Structure ID No</b>	MK-RP/WP87		MK-RP/WP88	
<b>Village Name</b>	Ayilpatti		Ayilpatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	5.5 m		7.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (11.646m)		Eccentric on LHS (11.728m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	19+560		19+750	
<b>Structure ID No</b>	MK-RP/WP89		MK-RP/WP90	
<b>Village Name</b>	Ayilpatti		Ayilpatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	7.5 m		8 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (11.765m)		Eccentric on LHS (11.68m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	20+620		20+660	
<b>Structure ID No</b>	MK-RP/WP91		MK-RP/WP92	
<b>Village Name</b>	Karkudalpatti		Karkudalpatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	8.5 m		7 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.529m)		Eccentric on RHS (11.9m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	20+725		20+760	
<b>Structure ID No</b>	MK-RP/WP92		MK-RP/WP93	
<b>Village Name</b>	Karkudalpatti		Karkudalpatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	8 m		5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on RHS (20.812m)		Eccentric on RHS (15.709m)	
<b>Ownership</b>	Government		Government	



Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+500		21+600	
Structure ID No	MK-RP/WP94		MK-RP/WT18	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8 m		5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.422m)		Eccentric on RHS (8.747m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+700		21+710	
Structure ID No	MK-RP/WP95		MK-RP/WP96	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6 m		8.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.075m)		Widening towards RHS (6.914m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+720		21+730	
Structure ID No	MK-RP/WP97		MK-RP/WP98	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7.5 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (6.961m)		Widening towards RHS (7.059m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+740		21+750	
Structure ID No	MK-RP/WP99		MK-RP/WP100	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7 m		7 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.134m)		Widening towards RHS (7.263m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+760		21+770	
Structure ID No	MK-RP/WP101		MK-RP/WP102	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6.5 m		6.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.39m)		Widening towards RHS (7.517m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	21+780		21+790	
Structure ID No	MK-RP/WP103		MK-RP/WP104	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6.5 m		6.5 m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.643m)		Widening towards RHS (7.769m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	21+800		21+810	
<b>Structure ID No</b>	MK-RP/WP105		MK-RP/WP106	
<b>Village Name</b>	Karkudalpatti		Karkudalpatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	5.5 m		6.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.845m)		Widening towards RHS (7.881m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	21+820		21+950	
<b>Structure ID No</b>	MK-RP/WP107		MK-RP/WP119	
<b>Village Name</b>	Karkudalpatti		Karkudalpatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	8 m		6.5	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.91m)		Widening towards RHS (14.138m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	24+940		25+007	
<b>Structure ID No</b>	MK-RP/WP108		MK-RP/WP109	
<b>Village Name</b>	Moolapallipatti		Moolapallipatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	5 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (7.4m)		Widening towards RHS (5.87m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	27+250		28+550	
<b>Structure ID No</b>	MK-RP/WP110		MK-RP/WP111	
<b>Village Name</b>	Namagiripettai		Namagiripettai	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	6.5 m		5.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (8.05m)		Widening towards RHS (7.883m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	28+600		28+620	
<b>Structure ID No</b>	MK-RP/WP112		MK-RP/WP113	
<b>Village Name</b>	Namagiripettai		Namagiripettai	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	7 m		5.5 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on RHS (8.296m)		Eccentric on RHS (8.427m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>			Abandoned	
<b>Chainage (km)</b>	28+750		28+760	
<b>Structure ID No</b>	MK-RP/WP114		MK-RP/WP115	
<b>Village Name</b>	Namagiripettai		Namagiripettai	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	7 m		6 m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (11.033m)		Eccentric on LHS (8.128m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>				
<b>Remarks</b>				

Impact	Direct Impact		Direct Impact	
Remarks			Abandoned	
Chainage (km)	29+170			
Structure ID No	MK-RP/WP116			
Village Name	Namagiripettai			
Side (Left/Right)	Right Side			
Distance from ECL	7 m			
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.088m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	Abandoned			

**Mohanur to Namakkal Section of Road No.5 (SH 95)**

Chainage (km)	1+050		1+180	
Structure ID No	WT01		WP01	
Village Name	Mohanur		Rasipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7m		9m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (14.52m)		Eccentric on LHS (9.953m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	1+950		1+900	
Structure ID No	WP02		WP03	
Village Name	Rasipalayam		Rasipalayam	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8m		9m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.393m)		Eccentric on RHS (12.488m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	3+450		5+250	
Structure ID No	WP04		WP05	
Village Name	Pettaipalayam		Ariyur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	11m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.496m)		Widening towards LHS (6.74m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	5+350		6+900	
Structure ID No	WP06		WP07	
Village Name	Ariyur		Ariyur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (7.88m)		Eccentric on RHS (14.857m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	7+195		7+540	
Structure ID No	WP08		WP09	
Village Name	Ariyur		Ariyur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		6.5m	
Length x Breadth	NA		NA	

Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (12.538m)		Eccentric on RHS (14.08m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	8+190		8+700	
Structure ID No	WP10		WP12	
Village Name	Aniyapuram		Aniyapuram	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (12.257m)		Widening towards RHS (11.092m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	9+990		11+570	
Structure ID No	WP14		WT02	
Village Name	Aniyapuram		Laddivadi	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7m		10m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (10.647m)		Eccentric on RHS (11.642m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	11+610			
Structure ID No	WP15			
Village Name	Laddivadi			
Side (Left/Right)	Right Side			
Distance from ECL	10m			
Length x Breadth	NA			
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.756m)			
Ownership	Government			
Impact	Direct Impact			
Remarks				

### 7.5.1.2. Ground Water

#### Construction Phase

Extraction of ground water for construction activities and domestic use of labour camps will result in depletion of local ground water table. Sources of ground water such as open wells, hand pumps and deep tube wells will be affected due to widening of project road at specific locations. **Table 7.12C and Table 8.3** present the details of the existing water resources and the possible impacts due to project. Selection of construction camps adjacent to open well will lead to contamination of ground water.







#### Operation Phase

Proposed construction of embankments at rolling terrain will reduce the permeability of the unpaved shoulder and will further decrease the ground water recharging rate to a great extent due to surface runoff. Paved surface of the road will further reduce the percolation of runoff water and decrease the ground water recharge.

**Table 7.12C. Impact on Ground Water Bodies**


Tiruchengode to Paramathy Section of Road No. 2 (SH 86)












Chainage (km)	55+000		55+160	
Structure ID No	TR-PA-BW-01		TR-PA-BW-02	
Village Name	Athipalayam		Athipalayam	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	10m		10m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (18.438m)		Eccentric on RHS (16.082m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	55+170		55+440	
Structure ID No	TR-PA-OW-01		TR-PA-BW03	
Village Name	Athipalayam		Athipalayam	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (16.106m)		Widening towards RHS (10.573m)	
Ownership	Govt./Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+070		57+480	
Structure ID No	TR-PA-BW-04		Hand Pump	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.814m)		Widening towards RHS (11.429m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		Abandoned	
Chainage (km)	57+510		57+590	
Structure ID No	TR-PA-BW-05		TR-PA-BW-06	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6m		7m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.555m)		Widening towards RHS (11.143m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	57+760		58+960	
Structure ID No	TR-PA-HP-01		TR-PA-OW-02	
Village Name	Pudupuliyampatti		Chittalandhur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	7m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.648m)		Widening towards RHS (10.559m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	59+065		59+130	
Structure ID No	TR-PA-BW-07		Bore Well	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Left Side		Left Side	

Distance from ECL	10m		6m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.238m)		Eccentric on LHS (11.434m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		Abandoned	
Chainage (km)	60+360		60+360	
Structure ID No	TR-PA-OW-3		TR-PA-BW-08	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	13m		10m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (15.024m)		Eccentric on LHS (15.024m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	60+415		60+700	
Structure ID No	TR-PA-BW-09		TR-PA-BW-10	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	10m		9m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.126m)		Widening towards RHS (11.433m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	62+250		64+300	
Structure ID No	TR-PA-BW-11		TR-PA-BW-12	
Village Name	Maniyanur		Maniyanur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	10m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (10.658m)		Eccentric on RHS (8.102m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	65+030		65+795	
Structure ID No	TR-PA-OW-04		TR-PA-BW-12	
Village Name	Maniyanur		Nallur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6m		9m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.85m)		Widening towards RHS (9.781m)	
Ownership	Govt./Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	66+020		67+840	
Structure ID No	Hand Pump		TR-PA-OW-05	
Village Name	Nallur		Nallur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7m		8m	
Length x Breadth	NA			
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.418m)		Eccentric on RHS (11.726m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		-	
Chainage (km)	68+080		68+140	
Structure ID No	TR-PA-OW-06		-	

Village Name	Nallur		Nallur	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	9m		5m	
Length x Breadth			NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (9.731m)		Widening towards LHS (7.719m)	
Ownership	Private			
Impact	Direct Impact		Direct Impact	
Remarks	-		Abandoned	
Chainage (km)	68+340		70+350	
Structure ID No	Bore Well		Bore Well	
Village Name	Nallur		Kunnamalai	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5m		8m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.222m)		Widening towards RHS (13.033m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks	Abandoned		Abandoned	
Chainage (km)	76+500		76+750	
Structure ID No	TR-PA-OW-07		Bore Well	
Village Name	Pillakalathur		Pillakalathur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	11m		8m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.349m)		Eccentric on RHS (11.513m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks	-	Abandoned		
Chainage (km)	76+840		79+160	
Structure ID No	TR-PA-BW-13		Hand Pump	
Village Name	Pillakalathur		Paramathi	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	9m		7m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.609m)		Eccentric on LHS (10.365m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks	-	Abandoned		
Chainage (km)	80+250		60+490	
Structure ID No	TR-PA-OW-08		BoreWell	
Village Name	Paramathi			
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	10m		6m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.525m)		Eccentric on RHS (11.545m)	
Ownership	Govt./Private		Government	
Impact	Direct Impact	Direct Impact		
Remarks	-	Abandoned		

### Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)

Chainage (km)	0+030		0+800	
Structure ID No	MK-RP/HP1		MK-RP/GW1	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Right side		Left side	
Distance from ECL	7m		8m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.69m)		Widening towards LHS (11.184m)	
Ownership	Government		Government	










<b>Impact</b>	Direct impact		Direct Impact	
<b>Remarks</b>	Abandoned			
<b>Chainage (km)</b>	1+100		1+210	
<b>Structure ID No</b>	MK-RP/GW2		MK-RP/PH1	
<b>Village Name</b>	Malliyakarai		Malliyakarai	
<b>Side (Left/Right)</b>	Left side		Left Side	
<b>Distance from ECL</b>	5.5m		8m	
<b>Length x Breadth</b>			1.5m x 1.5m	
<b>Proposed Widening</b>	Widening towards LHS (10.991m)		Eccentric on LHS (11.52m)	
<b>Ownership</b>	Government			
<b>Impact</b>	Direct impact			
<b>Remarks</b>				
<b>Chainage (km)</b>	1+250		1+500	
<b>Structure ID No</b>	MK-RP/PH2		MK-RP/GW3	
<b>Village Name</b>	Malliyakarai		Malliyakarai	
<b>Side (Left/Right)</b>	Right Side		Left side	
<b>Distance from ECL</b>	6m		7m	
<b>Length x Breadth</b>	1.5m x 1.5m			
<b>Proposed Widening</b>	Widening towards RHS (11.396m)		Eccentric on LHS (12.632m)	
<b>Ownership</b>			Government	
<b>Impact</b>	Direct impact		Direct impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	1+600		3+430	
<b>Structure ID No</b>	MK-RP/GW4		MK-RP/HP2	
<b>Village Name</b>	Malliyakarai		Gopalapuram	
<b>Side (Left/Right)</b>	Right side		Right side	
<b>Distance from ECL</b>	8m		4m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (11.253m)		Widening towards RHS (11.32m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	4+410		7+450	
<b>Structure ID No</b>	MK-RP/GW5		MK-RP/HP3	
<b>Village Name</b>	Gopalapuram		Thimmanayakapatti	
<b>Side (Left/Right)</b>	Right side		Left side	
<b>Distance from ECL</b>	4m		7	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Widening towards RHS (8.801m)		Widening towards LHS (11.35m)	
<b>Ownership</b>	Govt.		Govt.	
<b>Impact</b>	Direct Impact		Direct impact	
<b>Remarks</b>	Abandoned		Abandoned	
<b>Chainage (km)</b>	9+480		10+200	
<b>Structure ID No</b>	MK-RP/HP4		MK-RP/WT7	
<b>Village Name</b>	Eswaramurthypalaya m		Eswaramurthypalaya m	
<b>Side (Left/Right)</b>	Left side		Left side	
<b>Distance from ECL</b>	5m		5m	
<b>Length x Breadth</b>				
<b>Proposed Widening</b>	Eccentric on LHS (16.086m)		Eccentric on LHS (14.397m)	



Ownership	Government		Government	
Impact	Direct impact		Direct impact	
Remarks	Abandoned		Abandoned	
Chainage (km)	14+400		15+500	
Structure ID No	MK-RP/OW1		MK-RP/WT14	
Village Name	Mangalapuram		Navalpatti	
Side (Left/Right)	Left side		Left side	
Distance from ECL	7m		6m	
Length x Breadth				
Proposed Widening	Widening towards LHS (8.552m)		Widening towards LHS (10.978m)	
Ownership	Government		Government	
Impact	Direct impact		Direct Impact	
Remarks	Abandoned		With a water tank	
Chainage (km)	19+790		20+950	
Structure ID No	MK-RP/GW6		MK-RP/PH3	
Village Name	Ayilpatti		Karkudalpatti	
Side (Left/Right)	Left side		Right Side	
Distance from ECL	5.5m		6m	
Length x Breadth			2.5m x 2m	
Proposed Widening	Widening towards LHS (11.321m)		Widening towards LHS (6.356m)	
Ownership	Government		Government	
Impact	Direct impact		Direct impact	
Remarks				
Chainage (km)	21+050		21+210	
Structure ID No	MK-RP/GW7		MK-RP/GW8	
Village Name	Karkudalpatti		Karkudalpatti	
Side (Left/Right)	Right side		Right side	
Distance from ECL	5m		5m	
Length x Breadth				
Proposed Widening	Eccentric on RHS (8.342m)		Widening towards RHS (7.192m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	23+000		24+200	
Structure ID No	MK-RP/HP5		MK-RP/GW9	
Village Name	Moolapallipatti		Moolapallipatti	
Side (Left/Right)	Left side		Right side	
Distance from ECL	6m		5.5m	
Length x Breadth				
Proposed Widening	Eccentric on LHS (11.964m)		Widening towards RHS (9.392m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	29+270			
Structure ID No	MK-RP/HP6			
Village Name	Namagiripettai			
Side (Left/Right)	Left side			
Distance from ECL	5.5m			
Length x Breadth				
Proposed Widening	Widening towards LHS (7.713m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	Abandoned			

### Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

Chainage (km)	52+010		52+590	
Structure ID No	RP-TR/OW1		RP-TR/OW2	
Village Name	Minnampalli		Minnampalli	
Side (Left/Right)	Right side		Left side	
Distance from ECL	6m		8m	

Length x Breadth	2m x 2m		5m x 5m	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (13.141m)		Eccentric on LHS (12.976m)	
Ownership	Government		Private	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	52+615		52+850	
Structure ID No	RP-TR/OW3		RP-TR/OW4	
Village Name	Minnampalli		Minnampalli	
Side (Left/Right)	Left side		Right side	
Distance from ECL	8m		8m	
Length x Breadth	5m x 5m		5m x 4m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.246m)		Widening towards RHS (11.307m)	
Ownership	Private		Private	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	52+980		53+980	
Structure ID No	RP-TR/OW5		RP-TR/HP1	
Village Name	Minnampalli		Nagarpalayam	
Side (Left/Right)	Right side		Left side	
Distance from ECL	8m		5m	
Length x Breadth	5m x 5m		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.988m)		Widening towards RHS (11.672m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	54+020		54+100	
Structure ID No	RP-TR/HP2		RP-TR/HP3	
Village Name	Nagarpalayam		Nagarpalayam	
Side (Left/Right)	Left side		Left side	
Distance from ECL	4m		4.5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.149m)		Eccentric on LHS (12.872m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	54+650		55+100	
Structure ID No	RP-TR/HP4		RP-TR/HP5	
Village Name	Nagarpalayam		Nagarpalayam	
Side (Left/Right)	Left side		Left side	
Distance from ECL	5m		4m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (8.195m)		Widening towards LHS (8.975m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	55+110		55+510	
Structure ID No	RP-TR/OW6		RP-TR/BW1	
Village Name	Nagarpalayam		Nagarpalayam	
Side (Left/Right)	Left side		Left side	
Distance from ECL	4.5m		6m	
Length x Breadth	6m x 6m		NA	
Dist. From ECL to	Widening towards		Eccentric on LHS	

Pro. RoW (m)	LHS (9.05m)		(12.503m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	55+580		55+590	
Structure ID No	RP-TR/BW2		RP-TR/HP6	
Village Name	Marapparai		Marapparai	
Side (Left/Right)	Left side		Left side	
Distance from ECL	5m		4.5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (9.477m)		Widening towards LHS (10.286m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	55+620		56+550	
Structure ID No	RP-TR/BW3		RP-TR/HP7	
Village Name	Marapparai		Marapparai	
Side (Left/Right)	Right side		Left side	
Distance from ECL	8m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (12.037m)		Widening towards LHS (11.426m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	56+920		57+060	
Structure ID No	RP-TR/OW7		RP-TR/HP8	
Village Name	Marapparai		Marapparai	
Side (Left/Right)	Right side		Right side	
Distance from ECL	7m		4m	
Length x Breadth	4m x 4m		-	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (13.456m)		Eccentric on RHS (12.49m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-			
Chainage (km)	57+530		57+590	
Structure ID No	RP-TR/OW8		RP-TR/HP9	
Village Name	Marapparai		Marapparai	
Side (Left/Right)	Left side		Left side	
Distance from ECL	10m		5m	
Length x Breadth	4m x 4m		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (13.004m)		Eccentric on LHS (12.419m)	
Ownership	Private		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-			
Chainage (km)	57+810		59+100	
Structure ID No	RP-TR/BW4		RP-TR/PH1	
Village Name	Marapparai		Marapparai	
Side (Left/Right)	Right side		Right Side	
Distance from ECL	5m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (10.419m)		Widening towards LHS (11.226m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-			
Chainage (km)	59+150		59+300	
Structure ID No	RP-TR/HP10		RP-TR/OW9	

Village Name	Konnayar		Konnayar	
Side (Left/Right)	Right side		Left side	
Distance from ECL	5m		9m	
Length x Breadth	NA		4m x 4m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.398m)		Eccentric on LHS (11.283m)	
Ownership	Government		Private	
Impact	Direct Impact		Direct Impact	
Remarks	-	-		
Chainage (km)	60+100		60+500	
Structure ID No	RP-TR/BW5		RP-TR/BW6	
Village Name	Konnayar		Konnayar	
Side (Left/Right)	Right side		Left side	
Distance from ECL	4.5m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (22.054m)		Eccentric on LHS (12.287m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	60+510		60+520	
Structure ID No	RP-TR/HP11		RP-TR/BW7	
Village Name	Konnayar		Konnayar	
Side (Left/Right)	Right side		Left side	
Distance from ECL	4.5m		4m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (10.882m)		Eccentric on LHS(11.979m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	61+190		62+580	
Structure ID No	RP-TR/OW10		RP-TR/BW8	
Village Name	Konnayar		Konnayar	
Side (Left/Right)	Left side		Right side	
Distance from ECL	8m		4.5m	
Length x Breadth	4m x 4m		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (13.994m)		Widening towards RHS (4.967m)	
Ownership	Private	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	62+610		62+690	
Structure ID No	RP-TR/BW9		RP-TR/OW11	
Village Name	Konnayar		Konnayar	
Side (Left/Right)	Right side		Left side	
Distance from ECL	4.5m		9m	
Length x Breadth	NA		4m x 4m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (5.072m)		Eccentric on LHS (8.526m)	
Ownership	Government	Private		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	62+990		65+410	
Structure ID No	RP-TR/BW10		RP-TR/BW11	
Village Name	Konnayar		Agaram	
Side (Left/Right)	Left side		Right side	
Distance from ECL	7m		4.5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (8.952m)		Widening towards RHS (9.743m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	69+350		69+600	
Structure ID No	RP-TR/BW12		RP-TR/BW13	

Village Name	Unjanai		Unjanai	
Side (Left/Right)	Right side		Right side	
Distance from ECL	5m		4.5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.663m)		Eccentric on RHS (12.349m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-	-		
Chainage (km)	70+200		70+890	
Structure ID No	RP-TR/PH2		RP-TR/OW12	
Village Name	Unjanai		Unjanai	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6.5m		8m	
Length x Breadth			4m x 4m	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.731m)		Eccentric on RHS (11.536m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	59+300		59+450	
Structure ID No	Bore Well		Bore Well	
Village Name				
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	9		5	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS(11.82m)		Eccentric on LHS (12.35m)	
Ownership				
Impact	Direct Impact	Direct Impact		
Remarks				

### Mohanur to Namakkal Section of Road No.5 (SH 95)

Chainage (km)	1+630		2+920	
Structure ID No	BW01		OW01	
Village Name	Rasipalayam			
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		5m	
Length x Breadth	NA			
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (8.949m)		Eccentric on LHS (9.272m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	4+020		8+100	
Structure ID No	HP01		HP02	
Village Name	Ariyur		Aniyapuram	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7m		7m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (7.269m)		Eccentric on RHS (9.292m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	8+430		10+000	
Structure ID No	BW02		BW03	
Village Name	Aniyapuram		Aniyapuram	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	4m		5m	
Length x Breadth	NA		NA	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (10.793m)		Widening towards RHS (6.227m)	
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		

## 7.5.2. Alteration of Cross Drainage

During the construction period some amount of drainage alteration is anticipated, due to construction of temporary traffic diversions. Table below elaborates the need of diversion for the reconstruction and new proposed bridges.

**Table 7.11. Details of Bridges Reconstruction**

Sl. No	Location	Existing Span Arrangement (m)	Proposal	Proposed Span Arrangement (m)	Diversion
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>					
-	-	-	-	-	-
<b>Malliyakarai to Rasipuram and Rasipuram to Tiruchengode Sections of Road No.4. (SH 79)</b>					
1	4+338	2x3.6	Widening	--	NA
2	12+449	30x0.75m dia	Reconstruction	3x8x2	Diversion
3	14+206	3 x 4	Retained	--	NA
4	14+583	3 x 8.42	Widening	--	NA
5	18+250	2 x 4.5	Widening	--	NA
6	24+505	1 x 21.0	Widening	--	NA
7	28+430	2 x 5.7	Widening	--	NA
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>					
1	2+282	9x1.7	New construction on Realignment	3 x 5.5 x 3	NA
2	3+627	8x20.4m+19.9m+7.8m+33.2m+19.8m+7x20.4m	Retained	-	NA

With these widening of minor bridges and bridging of existing causeways, there will be an improvement in the drainage characteristics of the surrounding area and the alteration will be temporary in nature. All the diversions will be provided with adequate waterway for drainage.

## 7.5.3. Run-off and Drainage

Sediment accumulation in water bodies decreases the storage capacity for road run-off. To worsen the situation road construction activities can lead to increased run-off both, during the construction and operational stage. This can be considered a high adverse impact.

Phase of Construction	Reason
Construction phase	The removal of vegetation and compaction of soil can lead to increased run-off during the monsoon
Operational phase	The area of open ground lost and added impervious black top surface increases the amount and rate of run-off.

## 7.5.4. Water Requirement for Project

The water requirement for the construction depends on the climatic conditions, type of equipment, type of material available, mix design, type of construction plant and number of people working on the project. With the following assumptions, approximate water quantity required for the project has been calculated.

- 8-10% of weight of soil for the embankment construction
- 7-8% of weight of soil for sub grade construction

- 5-6% of weight of GSB materials for GSB and WMM
- 150 litres/ cum for concrete.

The water requirement has been assumed based on previous project experience and on the strict quality control basis. Domestic requirement of 150 liter per worker has been assumed. Details of water requirement assessed for the project are presented in **Table 7.12**.

**Table 7.12. Requirement of Water for Proposed Construction Works**

Sl. No.	Purpose	Cum/day
1	Permanent works (Total quantity in cum)	110,000 (2 Years) or 150 kl/day
2	Dust Suppression at work zone in (cum/day)	25
3	Curing (cum/day)	8
4	Laboratory (cum/day)	5
5	Haul Roads (cum/day)	15
6	Crusher (cum/day)	10
7	Plant Cleaning and workshop washing in (cum/day)	8
8	Domestic Purpose in (cum/day)	15
<b>Total Requirement (cum/day)</b>		<b>236</b>

Daily water requirement for the permanent works has been calculated assuming the construction period for 2 years.

## 7.5.5. Impacts on Water Quality

### 7.5.5.1. Surface Water Quality

#### Construction Phase

There are various water bodies such as rivers, streams (nalas) and canals crossing / abutting the project roads as presented in **Table 4.16**. Some impacts are anticipated on the water quality of these water bodies during the construction phase if water is present in water bodies. Discharge of untreated waste water generated from construction camps, labour camps to nearby water bodies will lead to deterioration water quality. Runoff from hill slopes, embankments and earthen shoulder may increase the chances of soil erosion, which result in turbidity and siltation of water bodies. Cleaning of construction machineries, equipment and vehicles shall further deteriorate the water quality.

#### Operation Phase

Impacts during operational phase are comparatively lesser than construction phase. The common impact during operation stage is spillage of petroleum and other hazardous materials due to road accidents, which may deteriorate the water quality to a considerable extent.

### 7.5.5.2. Ground Water Quality

#### Construction Phase

Selection of construction camps adjacent to open well will lead to contamination of ground water due to unscientific usage of water near open wells. Other than this, no other impacts are anticipated on ground water quality.

#### Operation Phase

No activities of the project during operation phase are expected to interfere with the ground water characters of the region and hence the impacts on the ground water quality are not anticipated.

## 7.6. Noise Environment – Impacts

### Construction Phase

During the construction phase of the road, the major sources of noise pollution are vehicles transporting the construction material to the construction yard and the noise generating activities at the yard itself. Mixing, casting and material movement are primary noise generating activities in the yard and will be uniformly distributed over the entire construction period. Construction activities are expected to produce noise levels in the range of 80 - 95 dB (A).

The construction equipment will have high noise levels, which can affect the personnel operating the machines. Use of proper Personal Protective Equipment (PPE) such as ear muffs will mitigate any adverse impact of the noise generated by such equipment.

The noise levels in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which in-turn are being enforced by Government of India through model rules framed under the Factories Act. The acceptable limit for each shift being of 8-hour duration; the equivalent noise level exposure during the shift is 90 dB (A). Hence, noise generated due to various activities in the construction camps may affect workers, if equivalent 8-hour exposure is more than the safety limit. ACGIH (American Conference of Government Industrial Hygienists) proposed an 8 hour Leq limit of 85 dB (A). Exposure to impulses or impact noise should not exceed 140 dB (A) (Peak acoustic pressure). Exposure to 10,000 impulses of 120 dB (A) is permissible per day.

The noise likely to be generated during excavation, loading and transportation of material will be in the range of 90 to 105 dB (A) and this will occur only when all the equipment operate together and simultaneously. This is however, is a remote possibility. The workers in general are likely to be exposed to an equivalent noise level of 80 to 90 dB (A) in an 8-hour shift, for which all statutory precautions should be taken into consideration.

Wherever the project road passes through populated areas at various villages, urban areas, sensitive receptors such as schools, colleges, hospitals and religious institutions along the road, people in these places will be exposed to high noise levels. Sensitive receptors along the project road are presented in

**Table 7.13A.** Source of noise pollution

**Table 7.15A. Sources of Noise Pollution**

Sr. No.	Phase	Source of Noise pollution	Impact categorization
1	Pre-construction	Man, material & machinery movements establishment of labor camps onsite offices, stock yards and construction plants	all activities will last for a short duration and also shall be localized in nature
2	Construction Phase	Plant Site stone crushing, asphalt production plant and batching plants, diesel generators etc Work zones	Plant Site: Impact will be significant within 500m. Work zones: Such impacts again will be of temporary nature as the construction site will go on changing



Sr. No.	Phase	Source of Noise pollution	Impact categorization
		Community residing near to the work zones	with the progress of the works.
3	Operation Phase	due to increase in traffic (due to improved facility)	will be compensated with the uninterrupted movement of heavy and light vehicles till the facility reaches the level of service C.

**Table 7.13B. List of Sensitive Noise Receptors Present along the Project Road Tiruchengode to Paramathy Section of Road No. 2 (SH 86)**


Chainage (km)	56+100		61+700	
Structure ID No	TR-PA-C1		TR-PA-S1	
Village Name	Puliyampatti		Peechipalayam	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	8m		10m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (11.656m)		Widening towards LHS (11.447m)	
Ownership	Private		Private	
Impact	Compound Wall will be affected		Compound Wall will be affected	
Remarks	Alpha Institute of Management		VIB Matriculation Higher secondary	
Chainage (km)	65+750		77+700	
Structure ID No	TR-PA-H1		TR-PA-S2	
Village Name	Kandampalayam		Pillakalathur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	10m		20m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.744m)		Widening towards RHS (11.428m)	
Ownership	Government		Private	
Impact	Compound Wall will be affected		Compound Wall will be affected	
Remarks	Government Public Health Center		Sivabakkiam Muthusamy H.S.S	
Chainage (km)	79+200			
Structure ID No	TR-PA-S3			
Village Name	Paramathi			
Side (Left/Right)	Left Side			
Distance from ECL	8m			
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (8.071m)			
Ownership	Government			
Impact	Compound Wall will be affected			
Remarks	Panchayat Union Elementary School			

**Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)**

Chainage (km)	9+480			
Structure ID No				
Village Name	Eswaramurthypalayam			
Side (Left/Right)	Left side			
Distance from ECL	12			
Length x Breadth				
Proposed Widening	Eccentric on LHS(16.08m)			

Ownership				
Impact	Direct Impact			
Remarks	PU Elementary School			

### Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

Chainage (km)	51+900		55+600	
Structure ID No				
Village Name	Minnampalli		Marapparai	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	5m		10m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.101m)		Eccentric on RHS (14.26m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Panchayath LP School		Govt. Primary Health Center	
Chainage (km)	55+900		71+150	
Structure ID No				
Village Name	Marapparai		Ilayampalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6m		9m	
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (12.031m)		Eccentric on LHS (12.299m)	
Ownership	Government		Private	
Impact	Direct Impact		Direct Impact	
Remarks	Skanda School of Architecture		Nursery School	

### Mohanur to Namakkal Section of Road No.5 (SH 95)

Chainage (km)	2+800		10+020	
Structure ID No	Government Public Health Center		Arumugham Udaiyar Govt Higher Secondary School	
Village Name	Mohanur		Aniyapuram	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	11m		8m	
Length x Breadth	20mx15m		75mx75m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.22m)		Widening towards RHS (9.426m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

### Operation Phase

Uninterrupted movement of heavy and light vehicles at high speeds may cause increase in ambient noise levels on the project roads. It may have negative environmental impacts on the sensitive receptors such as temples, mosques, schools, hospitals etc close to the project road. Variation of noise level with vehicle speed is given in **Table 7.14**.

**Table 7.14. Noise Level Variation with Vehicle Speed**

Speed (Km/h)	Noise Levels in dB (A) at 15 m			
	Cars*	Trucks	Buses	2/3 Wheelers
40	59.0	76.0	76.0	61.0
50	63.0	80.0	80.0	66.0
60	65.0	81.0	81.0	68.0
70	68.0	81.5	81.5	70.0

Speed (Km/h)	Noise Levels in dB (A) at 15 m			
	Cars*	Trucks	Buses	2/3 Wheelers
80	70.0	82.0	82.0	72.0
90	72.0	83.0	83.0	74.0
100	74.0	83.5	83.5	76.0

\*Noise levels for new cars are 5dB (A) or lower.

With the proposed improvement of the project road, the residential areas along the stretch on either side are likely to experience high day and night time noise levels. These noise levels significantly vary with vehicle speed as presented in **Table 7.14**.

## 7.7. Flora and Fauna – Impacts

The major impact in the project on flora involves the removal of trees to permit construction and to provide clear zone for safety of the road users. **Table 7.15** presents the major adverse impacts on the flora & fauna and the indicators chosen to assess the impacts for this study.

**Table 7.15. Impacts on Flora and Fauna due to Construction Activities**

Impacts due to Construction	Indicators
Loss of forest area/wild life sanctuary	Area of forest affected
Alteration of Wild life passage	Locations of wild life crossing of project road
Tree felling	No. of trees to be felled
Vegetation	Area of vegetation loss
Cattle Grazing Ground	Area and location of grazing ground.

### 7.7.1. Forest Area along the Project Roads

#### Construction Phase

Section I of Corridor 4 is abutting two Reserve Forests, Pudupatti East Beat RF on RHS (from Km 22+600 to Km 23+900) and Bailnadu RF on LHS (from Km 24+500 to Km 25+000). Section I of Corridor 5: Mohanur to Namakkal section of SH 95 is abutting Saravumalai RF on LHS (from Km 10+700 to Km 11+000). Since there is no diversion of forest land, no permanent impact is envisaged due to this project. However, impacts are anticipated on wildlife during construction phase due to noise generated by construction machineries and regular movement of construction vehicles. In the absence of proper accident management system, accidents of vehicles carrying hazardous chemicals during construction and operation phases will be hazardous to flora and fauna of the region.

### 7.7.2. Impacts on Wildlife

No wildlife crossing is found along the project corridor.

### 7.7.3. Tree Cutting

#### Construction Phase

Trees located within the formation width need to be removed for efficient construction workmanship and more importantly to prevent collision with the trees, in the case of accident. Roadside trees with strong and rigid stems can pose safety hazards. Some trees obstruct clear sight distances. Others have

a propensity to overturn when old and are potential safety hazards depending upon age and decay condition. All such trees that are safety hazards need to be cleared.

There will be a significant direct impact on cutting of the roadside trees, it includes

- Loss of shades
- Loss of tree products
- Loss of birds nesting places
- Removal of roadside trees will also reduce comfort levels for slow moving traffic and pedestrians
- Removal of trees will facilitate erosion and contribute to the loss of micro-ecosystems developed on the roadside.
- Besides, these trees act as noise barrier, dust absorption, air purifier, etc.

A detailed tree inventory of all the existing trees was carried out within the corridor of impact. Due care has been given in alignment design to reduce / minimize the loss of flora and green tunnels. Corridor wise details of the trees to be removed are summarized in **Table 7.16**. The major trees affected are Tamarind, Neem, Coconut, Palm tree etc.

**Table 7.16. Summary of Trees to be felled for the Proposed Improvement**

Name of the Corridor	No. of Trees to be Felled						Grand Total
	Govt			Pvt			
	LHS	RHS	Total	LHS	RHS	Total	
Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	1236	860	2096	55	10	65	2161
Malliyakarai to Rasipuram Section of Road No.4. (SH 79)	1111	975	2086	69	32	101	2187
Rasipuram to Tiruchengode Section of Road No.4. (SH 79)	976	664	1640	10	36	46	1686
Mohanur to Namakkal Section of Road No.5 (SH 95)	543	607	1150	20	8	28	1178

Source: Reconnaissance Survey conducted by CDM Smith

Cutting of trees for fuel by workers, especially near their camps is of major concern. Therefore, adequate training of the workers and availability of alternate fuel are to be ensured by the Contractors.

#### Operation Phase

The overall aesthetic of the area shall improve with landscaping and avenue plantation in the project stretch. Roadside plantation shall be restored and maintained as per compensatory tree plantation plan.

### 7.7.4. Removal of Vegetation

#### Construction Phase

Clearing and grubbing of the area is the foremost requirement to start the construction activities in accordance with MoRTH specifications. The impacts due to removal of vegetation includes

- Dust generation during windy atmosphere
- Loss of productive top soil

- Soil erosion during rainy season, may lead to water contamination

#### Operation Phase

The aesthetic of the project area shall improve with landscaping. No major impacts are identified during the operation phase.

### **7.7.5. Cattle Grazing**

No cattle grazing grounds have been found along the Corridor of Impact.

## **7.8. Socio-Economic Environment – Impacts**

### **7.8.1. Analysis of Positive and Negative Impacts on Present Status of Livelihood**

#### **7.8.1.1. Positive Impacts**

The accessibility and connectivity increase as these corridors are the major connectivity between various towns in Namakkal district. Thus, the time of travel between these places shall reduce significantly. With the advent of the two-lane highway the vehicle operating and maintenance cost is expected to go down substantially. These benefits can be attributed to smooth and even roads and low congestion. Saving in fuel consumption can be attributed to low congestion and relatively less travel time due to proposed improvement. The proposed road improvements shall also include general amenities like bus bays, pedestrian passes, road sign boards, street lights etc. and thus overall facilities to the road commuters shall improve. The proposed project is expected to improve the quality of life of the people residing in the project influencing area in terms of their economic, social and health status. Land value in the nearby areas of the proposed alignment will increase substantially. The overall aesthetics of the area shall improve with proposed landscaping and avenue plantation in the project stretch. During the construction stage of the project, both skilled and unskilled labours will be employed from the local villages to enhance the livelihood and economic standard of the people.

#### **7.8.1.2. Negative Impacts**

Improvement of proposed project improvements require acquisition of productive agriculture land, demolition of commercial and residential building, felling of trees required for up-gradation of road and shifting of public facilitating utilities such as electric poles, electric transformers, telephone lines, water supply lines, open and underground sewage lines etc. some of the community resources such as religious structures, educational institutes, panchayat meeting places and cattle grazing will be affected.

**Table 7.19. Impact on Social and Cultural Environment**

Environmental Component Affected	Project Activities										
	Planning and Design Phase	Pre Construction Phase			Construction Phase					Operation Phase	
	Design decisions and Implementation policies	Land acquisition	Removal of Structures	Removal of trees & vegetation	Earth works including quarrying	Laying of pavement	Vehicle & machine operation & maintenance	Asphalt and crusher plants	Labour Camps	Vehicle operation	Indirect Induced development
Agricultural land	-	Change in land prices	Loss of land economic value	Loss of standing crops	Loss of productive land	-	-	Dust on agricultural land reduce productivity	-	-	Conversion of Agricultural Land
Buildings and built structures	-	-	Loss of structures, Debris generation, Noise and Air pollution	-	Noise, vibration may cause damage to structures	-	Noise, vibration may cause damage to structures	Dust accumulation on building and structure	-	Vibration and noise	Change in building use and characteristics
People and Community	Anxiety and fear among community	-	Displacement of people, Psychological impact on people, loss of livelihood	Loss of shade & community trees, Loss of fuel wood and fodder, Loss of income	Noise and Air pollution	Odour and dust	Noise and Air pollution, Collision with pedestrians livestock and vehicles	Air and noise pollution and discomfort	Community clashes with migrant labour	Noise pollution, Risk of accident	Induced pollution
Cultural Assets	-	-	Displacement loss of structure from RoW	Loss of sacred trees.	Noise, vibration may cause damage to structure	-	Damage from vibration & air pollution	Dust accumulation	-	Damage from vibration & air pollution	-
Utilities and Amenities	-	-	Interruption in supply	-	-	-	Damage to utility and amenities	Dust accumulation on water bodies	Pressure on existing amenities	-	-
Labour's Health & Safety	-	-	-	-	Increase of stagnant water and disease	Asphalt odour and dust	Collisions with vehicles, pedestrians & livestock	Impact on health due to inhale of dust	Increase in communicable diseases	Collisions pedestrians & livestock	-

## **7.8.2. Fear of Uncertainties Regarding Future**

Land and property owners are subjected to suffering regarding uncertainties of the extent of loss and the nature of compensation. These involve,

- Uncertainty of the amount of land / property to be acquired
- Time of acquisition and evacuation
- Extent and amount compensation
- Provision of alternative land or job etc.

## **7.8.3. Inducement of Land Prices**

Once the project becomes common knowledge, there may be a danger of unscrupulous speculators moving into purchase land at what might seem to be advantageous prices, prior to the commencement of the official procedures. Such impacts are more likely to occur in the case of urban fringe areas during the design and pre-construction phase.

## **7.8.4. Inducement of Squatter Influx**

Squatters may attempt to occupy land along and adjacent to the proposed alignments, in the hope of receiving compensation or some other inducements to leave when construction commences. Such squatters could cause undue pressure on local resources such as water and firewood, which could result in conflicts with those who are harvesting the resources presently.

## **7.8.5. Loss of Utilities and Amenities**

Site clearances involves removal of various assets, utilities and amenities that are,

- Natural (trees, bushes, and grass lands), and
- Physical structures (public or private assets and utilities)
- Relocation of utilities like electricity, water and telephone lines

For people dependent on the above, this constitutes economic loss for some time before these are restored to their previous status. These have been further discussed in RAP.

## **7.8.6. Public Health and Safety**

a) Impacts on Public health and safety may arise during the phases of pre-construction, construction and operation phases. During the pre-construction and construction phases, dismantling of the structures for CoI clearance and road construction activities may result in the following health hazards:

- Dismantling of properties has psychological impacts on their owners and others associated with them.
- Debris generated on account of the above mentioned activities.

b) Labour Camps during construction period can bring the following problems.

- In the case of non-local labour (if so is arranged by the contractor), labour camps are set up at one or more sites adjacent to the alignment, and at some ancillary sites, like

aggregate quarries. These labours hired from outside can have clashes with the local population on account of cultural and religious differences. The influx of a large work force to an area, already hard pressed for basic services (medical services, power, water supply, etc.), can impose additional stress on these facilities.

- If alternative fuels are not made available to the workforce, there is a likelihood that trees will be cut down for cooking or heating purposes.
- Insanitary conditions in the labour camps might also result in impact on health of labours as well as the local population. Transmission of diseases is also facilitated by the migration of people. During the construction phase work, crews and their dependents may bring with them a multitude of communicable diseases including sexually transmitted diseases (STDs) like AIDS. This is more so if the nature of the project requires more male-workers, who have migrated from other parts of the state or country.

c) Allied activities during construction period may cause local disruption.

- During road construction allied activities like quarrying and crushing operations, traffic diversions, etc., may cause disruption of social and economic life of the local population of the nearby areas.
- Dust and noise generated in crushing and blasting operations may cause nuisance to the nearby communities.
- Traffic jams and congestion, loss of access and other road accident risks, as a result of diversion of traffic and construction work on road.

There will be some impact on land during construction, limited mainly to temporary acquisition to cater to road diversion or traffic detours and establishment of labour camps.

d) Accidents and Safety

- Although the design speeds have been kept lower in the major settlement areas, some amount of severance is expected in the rural areas. Especially where the residential area is on one side and their agricultural land and other facilities are on the other side of the highway. Schoolchildren and ladies carrying pots full of water from the water sources (ponds/wells) also get exposed to this risk. In rural areas, it was seen that cattle also cross the highways near the settlement.

### **7.8.7. Resettlement of People**

People, displaced from their homes and agricultural lands on account of the project, shall induce additional pressures to the local resource base. These include pressure on:

- Water resources in areas where availability is low,
- Grazing lands and fuel-wood,
- Public services such as schools and medical facilities.
- This is critical since number of displaced persons being squatters is larger than legal landholders formally displaced.



### **7.8.8. Land Use Changes**

#### Construction Phase

Upgradation of project road requires acquisition of agricultural land, commercial/ residential land and forest land, wherever the existing RoW is not accommodating design scheme. Loss of productive agricultural land may result from the establishment of construction camps, batch mix plant and hot mix plant, quarry and borrow area. This results in minor change in agricultural yield due to project activities. Temporary change in land use at fly over, bridge and culvert locations shall be encountered to facilitate the existing traffic by alternate routes. Land selected for borrow and quarry area will change the land use pattern permanently.

#### Operation Phase

Better access can lead to conversion of agricultural land to commercial and residential purpose close to project road, especially in rural and urban areas. This leads to decrease in agriculture production and loss of productive land. Aesthetics of the region shall change permanently. The urban fringe area along the project roads will be subjected to ribbon development.

### **7.8.9. Disturbance to the Road Side Services**

Along the highway, near settlements, small shops get attracted to serve the local people as well as the highway uses. A composite socio-economically inter-dependent has been developed as a consequence. It is likely that due to implementation of the project some of the shops may get displaced. This would cause negative impact on the livelihood of the people as well as loss of service to the local people and road users.

### **7.8.10. Removal of Encroachments and Squatters**

In order to reduce the number of PAPs, land clearing shall be restricted to within the Corridor of Impact (CoI) which principally lies within the RoW. Width of the CoI varies according to the design and is narrower in the settlement areas, where the numbers of PAPs are likely to be more. However, some amount of land clearing will be essential in several of these stretches.

The potential impacts likely to arise from clearance of encroached residential areas (especially in settlements along the project corridors) may involve loss of valuable residential space to the residents. In the case of squatter settlements, displacement might lead to loss of shelter if adequate measures are not taken for their resettlement. Compensation may not be enough for the affected persons to gain access to shelter. Other impacts include disturbance to family and community life and increased distance from their workplace. In such cases, the displaced persons may again resort to squatting.

The extent of loss in the case of encroached agricultural lands shall be relatively less, in comparison with residential and commercial properties. This because, the encroached lands form only a small part of the total cropped land of the farmers.

#### Specific Impact

Other socio-economic impacts involve the presence of sensitive community facilities within the Corridor of Impact such as worship places and cultural properties.

## 7.8.11. Sensitive Community Structures






Utmost care has been taken in finalizing the horizontal and vertical alignment so that the impact on cultural properties could be better avoided than mitigated. Impacts may be anticipated to the religious properties including temples and shrines present along the project roads. The total list of cultural properties identified within the proposed RoW will have experience positive or negative impact is provided in **Table 7.5**.




Besides direct impact, there are many possible indirect impacts due to construction activities, as follows.

- Access to religious places would be difficult during the construction period due to the presence of working areas, consequent traffic management issues, presence of heavy equipment, machineries and numerous workers and controlled sign boards
- Many existing sign boards and information boards will be removed for the construction work. This will make it more complicated for identifying the pilgrimage location, routes and landmarks.
- Safety issues and accidents could go high during the construction period.

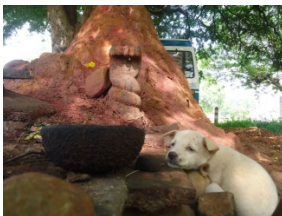



**Table 7.20. List of Sensitive Community Structures**

Tiruchengode to Paramathy Section of Road No. 2 (SH 86)

<b>Chainage (km)</b>	58+180		58+220	
<b>Structure ID No</b>	TR-PA-S01		TR-PA-S02	
<b>Village Name</b>	Pudupuliyampatti		Pudupuliyampatti	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	7m		4m	
<b>Length x Breadth</b>				
<b>Dist. From ECL to Pro. RoW (m)</b>	Eccentric on RHS (11.519m)		Widening towards RHS (11.255m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Eswaran Temple		Muniyappan Shrine	
<b>Chainage (km)</b>	59+900		60+000	
<b>Structure ID No</b>	TR-PA-T01		TR-PA-T02	
<b>Village Name</b>	Chittalandhur		Chittalandhur	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	7m		10m	
<b>Length x Breadth</b>				
<b>Dist. From ECL to Pro. RoW (m)</b>	Eccentric on RHS (10.264m)		Eccentric on RHS (8.664m)	
<b>Ownership</b>	Private		Private	
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>	Shirukalimathar Temple		Mahamuniyappan Kovil	
<b>Chainage (km)</b>	66+660		67+250	
<b>Structure ID No</b>	TR-PA-S03		TR-PA-T03	
<b>Village Name</b>	Chittalandhur		Nallur	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	6m			
<b>Length x Breadth</b>	10m x 20m			
<b>Dist. From ECL to Pro. RoW (m)</b>	Eccentric on RHS (11.734m)		Widening towards LHS (11.004m)	
<b>Ownership</b>	Private		Private	
<b>Impact</b>	Direct Impact		Compound Wall Will be affected	
<b>Remarks</b>	Ganapathy Shrine		Mariamman Kovil	

Chainage (km)	67+300		71+800	
Structure ID No	TR-PA-T04		TR-PA-T05	
Village Name	Nallur		Melsathambur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	9m		9m	
Length x Breadth	10m x 10m			
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (-11.532m)		Widening towards RHS (10.911m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks	Vinayaka Shrine		Ganapathy Temple	
Chainage (km)	76+600			
Structure ID No	TR-PA-S04			
Village Name	Pillakalathur			
Side (Left/Right)	Right Side			
Distance from ECL	10m			
Length x Breadth				
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (10.977m)			
Ownership				
Impact	Direct Impact			
Remarks	Shrine			




Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)

Chainage (km)	0+500		1+980	
Structure ID No	MK-RP/S1		MK-RP/S2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		6.5m	
Length x Breadth			2.5m x 2.5m	
Proposed Widening	Widening towards RHS (9.478m)		Eccentric on LHS (11.81m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	2+000		2+400	
Structure ID No	MK-RP/S3		MK-RP/S4	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7.5m		8m	
Length x Breadth	3m x 3m		4m x 3m	
Proposed Widening	Eccentric on LHS (12.625m)		Widening towards LHS (9.09m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	4+700		7+100	
Structure ID No	MK-RP/S5		MK-RP/S6	
Village Name			Thimmanayakampatti	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		5m	
Length x Breadth	1m x 1m			
Proposed Widening	Eccentric on LHS (11.537m)		Eccentric on LHS (12.45m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	8+660		8+650	
Structure ID No	MK-RP/T1		MK-RP/S7	
Village Name	Thimmanayakanampatti		Iswaramurthipalayan	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	6m		5m	
Length x Breadth				
Proposed Widening	Widening towards		Widening towards	

	RHS (8.36m)		RHS (7.53m)	
Ownership	Direct Impact		Direct Impact	
Impact				
Remarks	Temple			
Chainage (km)	9+360		12+220	
Structure ID No	MK-RP/T2		MK-RP/T3	
Village Name	Iswaramurthipalayam		Iswaramurthipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		6m	
Length x Breadth	3m x 4.5m		5m x 3m	
Proposed Widening	Widening towards LHS (10.98m)		Eccentric on LHS (9.03m)	
Ownership				
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	13+300		14+950	
Structure ID No	MK-RP/G1		MK-RP/T4	
Village Name	Managalapuram		Managalapuram	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		6.5m	
Length x Breadth			3m x 3m	
Proposed Widening	Eccentric on RHS (14.35m)		Eccentric on RHS (9.544m)	
Ownership				
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	17+600		28+020	
Structure ID No	MK-RP/S8		MK-RP/S9	
Village Name	Ayilpatti		Namagiripettai	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	5.5m		5.5m	
Length x Breadth			4m x 5m	
Proposed Widening	Eccentric on RHS (12.8m)		Eccentric on LHS (8.65m)	
Ownership				
Impact	Direct Impact	Direct Impact		
Remarks				
Chainage (km)	28+800		29+850	
Structure ID No	MK-RP/S10		MK-RP/S11	
Village Name	Namagiripettai		Namagiripettai	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	7m		9m	
Length x Breadth	7m x 6m		7m x 3m	
Proposed Widening	Widening towards RHS (7.971m)		Eccentric on LHS (16.62m)	
Ownership				
Impact	Direct Impact	Direct Impact		
Remarks				

Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

Chainage (km)	53+950		54+755	
Structure ID No	-		-	
Village Name	Nagarpalayam		Nagarpalayam	
Side (Left/Right)	Left side		Right side	
Distance from ECL	8m		4.5m	
Length x Breadth	100m x 30m		3m x 3m	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.003)		Eccentric on RHS (8.814m)	
Ownership	Private		Government	
Impact	Direct Impact	Direct Impact		
Remarks	Church	Vinayaka shrine		

Chainage (km)	55+300		55+500	
Structure ID No	-		-	
Village Name	Nagarpalayam		Marappara	
Side (Left/Right)	Left side		Left side	
Distance from ECL	7		7m	
Length x Breadth	80x40		5m x 5m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (34.889m)		Eccentric on LHS (12.512m)	
Ownership			Private	
Impact			Direct Impact	
Remarks	Grave yard		Vinayaka temple	
Chainage (km)	59+320		67+500	
Structure ID No	-		Vinayaka Shrine	
Village Name	Konnayar			
Side (Left/Right)	Left side		Left Side	
Distance from ECL	8m		8m	
Length x Breadth	2m x 2m		5m x 5m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.359m)		Eccentric on LHS (11.85m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Tree shrine			




Mohanur to Namakkal Section of Road No.5 (SH 95) - Nil

## 7.8.12. Bus Shelters, Bus Bays, Truck Lay Bys, Resting Places and Service Road

As a part of road improvement, bus shelters will be constructed/repared at all built-up locations. Proposal for bus shelter, bus bays are summarized in **Section 2.8.5**. All the existing bus shelters will be reconstructed / relocated or repaired / rehabilitated.

**Table 7.21. List of Bus Shelters**





Tiruchengode to Paramathy Section of Road No. 2 (SH 86)

Chainage (km)	57+400		57+400	
Structure ID No	TR-PA-BS-01		TR-PA-BS-02	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	13m			
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (14.768m)		Widening towards RHS (10.990m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		Converted into Milk collection Booth	
Chainage (km)	57+700		58+000	
Structure ID No	TR-PA-BS-03		TR-PA-BS-04	
Village Name	Pudupuliyampatti		Pudupuliyampatti	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL			7m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (10.805m)		Widening towards RHS (11.481m)	
Ownership	Government		Government	

Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	59+500		59+840	
Structure ID No	TR-PA-TS-01		TR-PA-BS-05	
Village Name	Chittalandhur		Chittalandhur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	2m		7m	
Length x Breadth	50m x 60m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (8.194m)		Eccentric on RHS (8.353m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Tempo Stand		-	
Chainage (km)	60+800		62+250	
Structure ID No	TR-PA-BS-06		TR-PA-BS-07	
Village Name	Chittalandhur		Maniyanur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	9m		12m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (11.097m)		Eccentric on LHS (12.342m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	63+550		63+550	
Structure ID No	Bus Shelter		TR-PA-BS-08	
Village Name	Maniyanur		Maniyanur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL			8m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.373m)		Widening towards RHS (10.679m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	64+330		65+300	
Structure ID No	TR-PA-BS-09		TR-PA-BS-10	
Village Name	Maniyanur		Maniyanur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	7m		7m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.099m)		Widening towards LHS (9.635m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	65+790		66+670	
Structure ID No	TR-PA-BS-11		TR-PA-BS-12	
Village Name	Nallur		Nallur	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	8m		7m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.781m)		Eccentric on RHS (11.851m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	








Chainage (km)	67+300		68+100	
Structure ID No	TR-PA-BS-13		TR-PA-BS-14	
Village Name	Nallur		Nallur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	8m		8m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.532m)		Eccentric on RHS (14.001m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	69+390		71+700	
Structure ID No	TR-PA-BS-15		TR-PA-BS-16	
Village Name	Nallur		Ramadevam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	7m		8m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (14.556m)		Eccentric on LHS (11.840m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	73+800		76+550	
Structure ID No	TR-PA-BS-17		TR-PA-BS-18	
Village Name	Nadandai		Pillakalathur	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	8m		9m	
Length x Breadth	4m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (11.5m)		Eccentric on LHS (12.344m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	-		-	
Chainage (km)	79+200		80+900	
Structure ID No	TR-PA-BS-19		TR-PA-TS-02	
Village Name	Paramathi		Paramathi	
Side (Left/Right)	Right Side		Left Side	
Distance from ECL	9m		80m x 5m	
Length x Breadth	4m x 2m		Widening towards LHS (7.933m)	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.497m)		Government	
Ownership	Government		Direct Impact	
Impact	Direct Impact		-	
Remarks	-		-	

Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)





Chainage (km)	0+300		2+620	
Structure ID No	MK-RP/BS1		MK-RP/BS2	
Village Name	Malliyakarai		Malliyakarai	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6m		6m	
Length x Breadth	4m x 3m		4m x 3m	
Proposed Widening	Eccentric on LHS (14.79m)		Eccentric on LHS (12.37m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks				
Chainage (km)	2+620		3+500	
Structure ID No	MK-RP/BS3		MK-RP/BS4	
Village Name	Malliyakarai		Rangappanaikanpalaiyam	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	8m		7m	
Length x Breadth	4m x 3m		4m x 3m	
Proposed Widening	Widening towards RHS (10.64m)		Eccentric on RHS (11.57m)	
Ownership				
Impact				
Remarks				









<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	4+150		6+550	
<b>Structure ID No</b>	MK-RP/BS5		MK-RP/BS7	
<b>Village Name</b>			Thimmanayakampatti	
<b>Side (Left/Right)</b>	Left Side		Right Side	
<b>Distance from ECL</b>	5m		7.5m	
<b>Length x Breadth</b>	4.5m x 4m		3m x 4m	
<b>Proposed Widening</b>	Widening towards LHS (11.31m)		Widening towards RHS (9.05m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	7+780		10+200	
<b>Structure ID No</b>	MK-RP/BS8		MK-RP/BS9	
<b>Village Name</b>	Thimmanayakampatti		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	5m		5m	
<b>Length x Breadth</b>	4m x 3m		4m x 3m	
<b>Proposed Widening</b>	Widening towards LHS (10.62m)		Eccentric on LHS (14.39m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	12+210		12+500	
<b>Structure ID No</b>	MK-RP/BS11		MK-RP/BS12	
<b>Village Name</b>	Iswaramurthipalayam		Iswaramurthipalayam	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	4.5m		6m	
<b>Length x Breadth</b>	4m x 3m			
<b>Proposed Widening</b>	Eccentric on LHS (9.25m)		Eccentric on LHS (8.06m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	13+400		13+850	
<b>Structure ID No</b>	MK-RP/BS13		MK-RP/BS14	
<b>Village Name</b>	Managalapuram		Managalapuram	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	7m		7.5m	
<b>Length x Breadth</b>	4m x 3m		4m x 3m	
<b>Proposed Widening</b>	Widening towards RHS (7.97m)		Eccentric on LHS (8.44m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>			Encroched	
<b>Chainage (km)</b>	14+400		14+950	
<b>Structure ID No</b>	MK-RP/BS15		MK-RP/BS16	
<b>Village Name</b>	Managalapuram		Managalapuram	
<b>Side (Left/Right)</b>	Right Side		Right Side	
<b>Distance from ECL</b>	7m		6m	
<b>Length x Breadth</b>	4m x 3m		4m x 3m	
<b>Proposed Widening</b>	Widening towards RHS (8.55m)		Eccentric on RHS (9.54m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	16+460		17+970	
<b>Structure ID No</b>	MK-RP/BS17		MK-RP/BS18	
<b>Village Name</b>	Navalpatti		Ayilpatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	5.5m		7m	
<b>Length x Breadth</b>	4m x 3m		4m x 2m	
<b>Proposed Widening</b>	Widening towards LHS (13.33m)		Eccentric on LHS (8.1m)	



<b>Ownership</b>				
<b>Impact</b>	Direct Impact		Direct Impact	
<b>Remarks</b>				
<b>Chainage (km)</b>	17+980		20+200	
<b>Structure ID No</b>	MK-RP/BS19		MK-RP/BS20	
<b>Village Name</b>	Ayilpatti		Karkudalpatti	
<b>Side (Left/Right)</b>	Right Side		Left Side	
<b>Distance from ECL</b>	7m		10.5m	
<b>Length x Breadth</b>	4m x 3m		4m x 3m	
<b>Proposed Widening</b>	Eccentric on RHS (8.1m)		Eccentric on LHS (11.75m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>				
<b>Chainage (km)</b>	20+620		23+020	
<b>Structure ID No</b>	MK-RP/BS21		MK-RP/BS23	
<b>Village Name</b>	Karkudalpatti		Moolappallipatti	
<b>Side (Left/Right)</b>	Left Side		Left Side	
<b>Distance from ECL</b>	5.5m		6m	
<b>Length x Breadth</b>	3m x 2m		4m x 3m	
<b>Proposed Widening</b>	Eccentric on LHS (8.48m)		Eccentric on LHS (10m)	
<b>Ownership</b>				
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>				
<b>Chainage (km)</b>	24+250			
<b>Structure ID No</b>	MK-RP/BS24			
<b>Village Name</b>	Moolappallipatti			
<b>Side (Left/Right)</b>	Left Side			
<b>Distance from ECL</b>	7.5m			
<b>Length x Breadth</b>	4m x 3m			
<b>Proposed Widening</b>	Widening towards LHS (11.79m)			
<b>Ownership</b>				
<b>Impact</b>	Direct Impact			
<b>Remarks</b>				

Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

<b>Chainage (km)</b>	51+930		53+700	
<b>Structure ID No</b>	RP-TR/BS1		RP-TR/BS2	
<b>Village Name</b>	Minnampalli		Minnampalli	
<b>Side (Left/Right)</b>	RHS		Right side	
<b>Distance from ECL</b>	7m		4.5m	
<b>Length x Breadth</b>	4m x 2m		3m x 3m	
<b>Dist. From ECL to Pro. RoW (m)</b>	Widening towards RHS (11.972m)		Eccentric on RHS (10.934m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		
<b>Remarks</b>	Bus shelter	Bus shelter		
<b>Chainage (km)</b>	55+100		57+620	
<b>Structure ID No</b>	Nil		RP-TR/BS3	
<b>Village Name</b>	Nagarpalayam		Marapparai	
<b>Side (Left/Right)</b>	Left side		Left side	
<b>Distance from ECL</b>	4		7m	
<b>Length x Breadth</b>	Nil		2m x 1.5m	
<b>Dist. From ECL to Pro. RoW (m)</b>	Eccentric on RHS (7.554m)		Eccentric on LHS (11.828m)	
<b>Ownership</b>	Government		Government	
<b>Impact</b>	Direct Impact	Direct Impact		

Remarks	Tempo stand-No structure		Bus shelter	
Chainage (km)	58+385		60+300	
Structure ID No	RP-TR/BS4		RP-TR/BS5	
Village Name	Marapparai		Konnayar	
Side (Left/Right)	Right side		Right side	
Distance from ECL	7m		4.5m	
Length x Breadth	4m x 1m		2m x 1m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (9.815m)		Eccentric on RHS (16.585m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Bus shelter		Bus shelter	
Chainage (km)	61+350		62+700	
Structure ID No	RP-TR/BS6		RP-TR/BS7	
Village Name	Konnayar		Konnayar	
Side (Left/Right)	Left side		Right side	
Distance from ECL	9m		5m	
Length x Breadth	3m x 2m		4m x 2m	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (10.232m)		Widening towards RHS (7.758m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Bus shelter		Bus shelter	
Chainage (km)	64+090		67+500	
Structure ID No	RP-TR/BS8		RP-TR/BS9	
Village Name	Agaram		Kumarapalayam	
Side (Left/Right)	Right side		Left side	
Distance from ECL	6.8m		4.5m	
Length x Breadth	4m x 1m		2m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (9.038m)		Eccentric on LHS (11.854m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Bus shelter		Bus shelter	
Chainage (km)	69+790		70+600	
Structure ID No	RP-TR/BS10		RP-TR/BS11	
Village Name	Unjanai		Ilayampalayam	
Side (Left/Right)	Left side		Right side	
Distance from ECL	5m		5m	
Length x Breadth	3m x 2m		3m x 2m	
Dist. From ECL to Pro. RoW (m)	Concentric (11.508m)		Concentric (11.415m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks	Bus shelter		Bus shelter	
Chainage (km)	70+130			
Structure ID No	RP-TR/BS12			
Village Name	Ilayampalayam			
Side (Left/Right)	Left side			
Distance from ECL	7m			
Length x Breadth	3m x 2m			
Dist. From ECL to Pro. RoW (m)	Concentric (11.414m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	Bus shelter			

Mohanur to Namakkal Section of Road No.5 (SH 95)

Chainage (km)	1+370		2+900	
Structure ID No	MH-NK/BS01		MH-NK/BS02	

Village Name	Rasipalayam		Pettaipalayam	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	6m		4m	
Length x Breadth	5m x 2m		4m x 1.5m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (8.331m)		Eccentric on LHS (9.671m)	
Ownership	Government		Government	
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	5+150		6+395	
Structure ID No	MH-NK/BS03		MH-NK/BS04	
Village Name	Ariyur		Ariyur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5.5m		5.5m	
Length x Breadth	3m x 2m		2.5m x 2.5m	
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (8.145m)	Widening towards RHS (6.039m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	6+405		6+900	
Structure ID No	MH-NK/BS05		MH-NK/	
Village Name	Ariyur		Ariyur	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	6m		5m	
Length x Breadth	3m x 2m		1.5m x 0.3m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (12.235m)	Eccentric on RHS (14.857m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	Benches		
Chainage (km)	8+030		11+500	
Structure ID No	MH-NK/BS07		MH-NK/BS08	
Village Name	Aniyapuram		Laddivadi	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	4m		7m	
Length x Breadth	3m x 2m		3m x 2m	
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (9.659m)	Widening towards RHS (11.398m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	11+600		12+170	
Structure ID No	MH-NK/BS09		MH-NK/BS10	
Village Name	Laddivadi		Laddivadi	
Side (Left/Right)	Left Side		Right Side	
Distance from ECL	6m		7.5m	
Length x Breadth	3m x 2m		5m x 2m	
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (11.276m)	Eccentric on RHS (11.685m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	12+260		12+700	
Structure ID No	MH-NK/BS11		MH-NK/BS12	
Village Name	Laddivadi		Laddivadi	
Side (Left/Right)	Left Side		Left Side	
Distance from ECL	5m		4.5m	
Length x Breadth	5m x 2m		3m x 2m	
Dist. From ECL to Pro. RoW (m)	Concentric (-11.465m)	Concentric (-7.948m)		
Ownership	Government	Government		
Impact	Direct Impact	Direct Impact		
Remarks	-	-		
Chainage (km)	13+320			

Structure ID No	MH-NK/BS13			
Village Name	Laddivadi			
Side (Left/Right)	Left Side			
Distance from ECL	5m			
Length x Breadth	4n x 2m			
Dist. From ECL to Pro. RoW (m)	Widening towards LHS (7.832m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	-			

### 7.8.13. Truck Lay bye, Resting Place and Service Road




No truck lay bye, resting places and service roads are proposed as part of the subject project.

### 7.8.14. Other Community Utility Properties



Besides cultural / religious properties, many community utility properties like BSNL OFCs, Water Pipelines, Electric poles, Gas Pipe Lines etc. exist within the existing RoW. Utmost care shall be taken to shift this utilizes with the permission of concerned departments.

**Table 7.22: List of other Community Utility Properties**

Tiruchengode to Paramathy Section of Road No. 2 (SH 86)

Chainage (km)	65+500		66+400	
Structure ID No	Police Station		Ration Shop	
Village Name	Kandampalayam		Nallur	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	16m		7m	
Length x Breadth	50m x 30m		25m x 50m	
Dist. From ECL to Pro. RoW (m)	Widening towards RHS (12.289m)		Widening towards RHS (7.947m)	
Ownership				
Impact	Direct Impact		Direct Impact	
Remarks	CW will be affected for 50m		-	
Chainage (km)	67+000			
Structure ID No	Electricity Board & Staff Quarters			
Village Name	Nallur			
Side (Left/Right)	Left Side			
Distance from ECL	8m			
Length x Breadth	150m x 1000m			
Dist. From ECL to Pro. RoW (m)	Eccentric on LHS (14.246m)			
Ownership				
Impact	Direct Impact			
Remarks	Fencing will be affected			

Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)

Chainage (km)	0+100		24+800	
Structure ID No	Police Station		Koraiyar WT and Quarters	
Village Name	Malliyakara		Moolapaltipatty	
Side (Left/Right)	Right Side		Right Side	
Distance from ECL	5m		5m	
Length x Breadth				
Proposed Widening	Widening towards RHS (7.838m)		Eccentric on RHS (8.242m)	
Ownership	Government		Government	
Impact	Direct Impact		Direct Impact	
Remarks				

Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)

Chainage (km)	55+590			
Structure ID No	-			
Village Name	Vaiyyapamalai			
Side (Left/Right)	Right Side			
Distance from ECL	14m			
Length x Breadth	6m x 10m			
Dist. From ECL to Pro. RoW (m)	Eccentric on RHS (14.842m)			
Ownership	Government			
Impact	Direct Impact			
Remarks	VAO Office			

Mohanur to Namakkal Section of Road No.5 (SH 95) - Nil

## 7.9. Cumulative Environmental Impact Assessment

Cumulative Impacts are the overall effects caused by the totality of past, present and foreseeable future actions. Cumulative effects can result from incremental changes caused by the interactions between effects within a project and/or the interaction with the effects from other developments. With regard to road schemes, cumulative effects are considered in the following ways:

- **Multiple effects from the scheme**, and from different schemes of the same or similar type, upon the same resource; such as the effect on a single community of noise from several transport sources.
- **Different multiple effects from the scheme, and from other schemes**, upon the same resource; such as land take and damage due to hydrological change, affecting several sites of the same habitat.
- **Incremental effects** arising from a number of small actions, including ongoing maintenance operations, having developed or developing over time.

This section describes the different developments that have been taken into account and the likely cumulative effects resulting from the interaction with the current project i.e., Phase-I roads under TNRSP-II.

The following projects have been taken into account as being likely to occur prior to the completion or during the construction or operation of the Phase-I roads under TNRSP-II.

1. Namakkal-Tiruchengode Road widening to a four-lane road at a cost of Rs 140 crore
2. Opening of the Indian Railways (IR) Karur-Namakkal-Salem new broad gauge railway line for freight traffic.
3. Construction of railway stations at Mallur, Rasipuram, Puduchatram, Kalangani, Namakkal, Lathuvadi, Mohanur, Vangal and Karur.
4. World Bank aided Tamil Nadu Irrigated Agriculture Modernization and Water bodies Restoration and Management (TN IAMWARM) Project in Salem District.
5. Potential investment opportunity of around Rs.50 Lakh in Poultry based products in Namakkal, and Elachipalayam region as per the information from Department of Industries and Commerce, Namakkal.

6. Potential investment opportunity of around Rs.35 Lakh in Lorry body building and repair in Namakkal and Tiruchengode region as per the information from Department of Industries and Commerce, Namakkal.
7. Setting up of Polyester viscose yarn unit at Tiruchengode, in Namakkal district of Tamil Nadu. by Sri Santhanalakshmi Spinners.
8. Other rural infrastructure development works by Government of Tamil Nadu.
9. Demolition and construction activity as a result of Land Accusation and Rehabilitation of current project.

### **7.9.1. Cumulative Impacts of Vehicular Traffic at Junctions**

There will be temporary direct adverse effects on traffic during construction of Phase-I roads under TNRSP-II particularly at junctions. Simultaneous construction of the railway stations, residential and commercial properties will increase the traffic flow in the short term.

The opening of railway freight corridor will be beneficial for the textile and poultry industries in namakkal district, who will be encouraged to transport their produce through railways. This alternate mode of transport will reduce the overall traffic on the highways but will increase the traffic at junctions due to movement of goods to railway freight handling centers.

The vehicular traffic at junctions will also be at strain due to growth of economic activity in Salem and Namakkal districts. Poultry, lorry body building and textile industries are crucial for the economy of this region. As per the estimates of the state and district governments there is still huge potential for the growth of these segments. Expansion of above sectors will significantly increase the vehicular traffic.

The programme for all the above projects is not currently known, so it is not currently possible to predict the level of disruption that may occur. However, if all these projects occur simultaneously, there could be significant cumulative impact. Though it is very unlikely that all the projects will take off at a time, never the less the contractor should be aware of other project activities in the region and plan his activities in a way to reduce impact. Traffic management measures proposed in Chapter 8 of this document and also in EMP will ensure effects are insignificant. The junction improvements that will be taken up in all the major junctions will also aid in reducing the cumulative impact of vehicular traffic at junctions.

### **7.9.2. Cumulative Impacts on Road Safety**

As pointed out in the previous section, simultaneous execution of all the projects will significantly increase the vehicular traffic there by increasing cumulative impact on road safety. However proposed Phase-I roads under TNRSP-II are wider at places and designed in a manner to increase road safety. Thus the overall impact on road safety post construction phase will be lesser than otherwise. The Contractor should follow all the safety measures proposed in Chapter 8 and in EMP document during the construction phase meticulously to reduce cumulative impact.

### **7.9.3. Cumulative Impacts on Valued Ecosystem Components (VEC)**

A valued ecosystem component (VEC) is an element of the environment that has scientific, economic, social or cultural significance.

As far as the wildlife, forests and geology are concerned the project have no direct impact thus the cumulative impact is also nill. Environmental impact on other valued ecosystem components like air, water, noise, vegetation and social aspects is significant, the cumulative impact could increase if other projects are implemented simultaneously.

Impacts on air quality during the construction phase of the project will be considerable as the amount of work involved in improvement of the road is significant. However, any possible impacts will be transitory. Due to the proposed project, there will be some direct and indirect long-term impacts on the water resources as well as sensitive noise receptors. The major impact in the project on flora involves the removal of trees to permit construction and to provide clear zone for safety of the road users. All these impacts can aggravate if other similar projects are implemented together.

Though it is very unlikely that all the projects will take off at a time, never the less the contractor should be aware of other project activities in the region and plan his activities in a way to reduce impact. Provision of adequate air pollution control equipment, like dust filters and measures like dust suppression by water sprinkling and planting of green belt may help to significantly reduce the impact

On the socio economic front the project has both positive and negative impact. The project roads run through fertile agricultural lands and settlements and hence, the impacts of land acquisition are expected to have significant effect on livelihood and economic activities of the project area. On the other hand accessibility and connectivity increase as these corridors are the major connectivity between various towns in Namakkal district. Thus, the time of travel between these places shall reduce significantly. With the advent of the two-lane highway the vehicle operating and maintenance cost is expected to go down substantially.

As the Karur-Namakkal-Salem railway project is already completed and other proposed projects will not require large scale land accusation the cumulative impact on this front will be minimal. Where as, better road connectivity will lead to economic development of the region. The cumulative impacts of which are difficult to anticipate at this stage.

The activities associated with current project will contribute minimally to the impacts of other current and reasonably foreseeable projects. By adopting suitable mitigation measures as suggested in Chapter 8 and EMP reports the overall impact can be reduced significantly.

# Chapter 8. Impact Mitigation and Enhancement

## 8.1. Avoidance, Minimization, Mitigation, and Enhancement

Prevention or avoidance of impact is better than mitigation of impact. Hence, avoidance and reduction of adverse impacts approaches were adopted without jeopardizing the road safety concern, during the design stage through continued interaction between the design and environmental teams. This is reflected in the designs of the horizontal & vertical alignment, cross sections adopted, construction methods and construction materials. In-depth site investigations have been carried out so that sensitive environmental resources are effectively avoided, leading to the environmentally best-fit alignment option. The EIA mechanism applied to the project comprises following key principles in the following order of priority.

- Avoid adverse environmental impact
- Minimise and control adverse environmental impact
- Mitigate adverse environmental impact
- Enhance the environment

Matrix method was followed for the identification and evaluation of impacts. The activity – impact identification matrix is presented as **Annexure 7.1**. Environmental Management Action Plan (EMAP) for the mitigation of impacts and environmental enhancement is presented in the standalone Environmental Management Plan (EMP) Reports for each project road.

**Table 8.1. Environmental Features Saved through Avoidance Measure at Design Stage**

Environmental Features	Potential Impact	Under Direct Impact	Saved through alignment design
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>			
Trees (nos.)	4373	2161	2212
Surface Water source	69	54	15
Ground Water source	55	32	23
Schools and Hospitals	15	5	10
Sensitive Community Properties	35	9	26
Bus Shelters	25	22	3
Other community structures	5	3	2
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>			
Trees (nos.)	5271	2187	3084
Surface Water source	162	135	27
Ground Water source	97	21	76
Schools and Hospitals	13	1	12
Sensitive Community Properties	39	16	23
Bus Shelters	24	21	3
Other community structures	5	2	3
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>			



Trees (nos.)	2079	1686	393
Surface Water source	125	125	0
Ground Water source	42	40	2
Schools and Hospitals	10	4	6
Sensitive Community Properties	16	6	10
Bus Shelters	13	13	0
Other community structures	2	0	2
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>			
Trees (nos.)	2419	1178	1241
Surface Water source	27	15	12
Ground Water source	13	6	7
Schools and Hospitals	13	2	11
Sensitive Community Properties	13	0	13
Bus Shelters	14	13	1
Other community structures	0	0	0

## 8.2. Air Environment – Mitigation Measures

Motor vehicles have emerged as one of the major sources of air pollution especially in urban areas. Due to proposed road improvements aimed at enhancing the efficiency of road transport system the number of vehicles on these roads will be increased overtime.

### 8.2.1. Meteorological Factors and Climate – Mitigation

#### Construction Phase

Felling of large of trees, laying of pavement and other construction activity may cause temporary impact on micro climate of the project influence area. Other than this, no other significant impacts are envisaged in climatic parameters such as precipitation, wind speed, wind direction, temperature, and relative humidity.

#### Operation Phase

The objective of the present project is only to improve the existing road. Hence, no changes in climatic conditions are anticipated. If any minor impact do exist due to the proposed improvement, it will be mitigated by compensatory and additional afforestation and avenue plantation. Summary of potential impact and mitigation measures proposed is mentioned below.

Sl. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Meteorological factors and climate	Marginal impact	Due to production and laying of hot bituminous mix.	Avenue plantation Plantation in realignment sections Turving at major junctions and realignment sections
2a	Air quality - emissions	Temporary and location specific	Shifting of utilities, removal of trees & vegetation, transportation of material	Sprinkling of Water Fine materials to be completely covered, during transport & stocking.
	Pre-	(Dust	Installation of	Plant to be installed in

Sl. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
	construction stage	Generation)	construction plants	Downwind direction from nearby settlement.
2b	Air quality - emissions  Construction Stage	Moderate impact  (Gaseous pollutants & Dust generation)	Clearing and grubbing materials dumping brushing of the surface access roads to borrow-areas Hot mix plants, Crushers Paving of asphalt layers Labour Camps	Air pollution Norms will be enforced, Laborers will be provided mask. Local people will be educated on safety and precaution. on accessing roads, newly constructed embankment etc.
2c	Air quality - emissions  Operation Stage	Moderate impact  (Gaseous pollutants)	Air pollutants from traffic  Dust emission from tyres	Compliance with future statutory regulatory requirements Auto-technology, vehicular fuel quality- improvement
3	Air quality - monitoring	--	Effectiveness / shortfall (if any) Any unforeseen impact.	Measures will be revised & improved to mitigate/ enhance environment due to any unforeseen impact.

## 8.2.2. Air Emissions – Mitigation

### Construction phase

During the construction stage, there are two major sources, the first one is construction activities at working zones, which cause primarily dust emission and the second one is the operation of the construction plant, equipments and machinery, which causes gaseous pollutants. The specific measures include:

- In order to curb the increased fugitive dust emissions in the area due to vehicular movement raw material transport and borrow area excavation, provisions should be made for sprinkling of water on all the roads in the area of improvement. Sprinkling of water should be carried out at least twice a day on a regular basis during the entire construction period especially in the winter and summer seasons. Special attention should be given in the sections where the alignment passes through village and urban areas. Daily inspection at construction site should be carried out to ensure removal of construction debris to the landfill sites.
- Dust covers/ tarpaulins should be provided to cover construction material loaded on trucks, which will be used for the transportation of materials prone to fugitive dust emissions.
- Water will be sprayed on earthworks, temporary haulage and diversion on a regular basis.
- Construction requiring street closings in heavy traffic areas should be performed during off-peak hours.
- Idling of delivery trucks or other equipment should not be permitted during periods of unloading or when they are not in active use.
- Construction vehicles and machineries should obtain “Pollution under Control” certificate from the concerned regulatory authority.

- The fugitive emission from the construction yards is expected to have significant influence up to 1km distance on the downwind direction under adverse meteorological conditions. Hence, it is essential that the construction yards should be located beyond 1km distance from the human settlements in the predominant down wind direction.
- All stationary equipment should be located as far as practically possible from receptor locations in order to allow dispersion of emitted pollutants.
- Suitable air pollution control measures such as electro static precipitator, cyclone separators, bag filters and scrubber should be adopted for hot mix plants, batching mix plants to avoid fugitive emissions.
- Construction workers should be provided with Personal Protective Equipments.
- The construction operations during nights should be carried out under restricted conditions. The work schedule and the operation time of each machine should be suitably modified so as to have limited construction activity to exercise a control on the ambient air quality levels.
- Proper care should be taken for storage of furnace oil, Light Diesel Oil (LDO) etc.
- Air pollution monitoring plan has been delineated for construction phase separately for checking the effectiveness of the mitigation measures adopted during the construction phase of the Contract.

### Operation Phase

As indicated in previous chapter, the air pollutant will be form vehicular movement on road and dust emission. As such the national and international bodies are quite active in controlling the air pollution through emission limit, auto technology and fuel quality, which will counter the increase in air pollution due to increase in traffic during operation phase. Additional measures proposed are below.

- As soon as construction is over the surplus earth should be utilised to fill up low-lying areas. In no case, loose earth should be allowed to pile up along the alignment.
- During operation stage, the most effective control methods of air pollution due to vehicular emissions is to use fuel efficient engines, introduction of catalytic converters for petrol vehicles and use of smoke traps for diesel vehicles.
- It should be made compulsory for all vehicles to adhere to the engine maintenance schedules and standards to reduce air pollution due to vehicular emissions.
- Along the project roads, plantation of trees such as Neem, which is known to absorb Hydrocarbons, is recommended. Care should however, be taken to space the trees so that they will not restrict movement of air.
- Development of landscape along the road can reduce concentration of pollutants at the ground level. It is, therefore, recommended that the area available on both sides of the road be used to develop a green belt with dense canopy to minimize the air quality impacts in the downwind regions. Such development will also improve the general aesthetics in the region.
- Air quality monitoring should be conducted as per Environmental Monitoring Plan.
- Other measures such as the reduction of vehicular emissions, ensuring vehicular maintenance and up-keep, educating drivers about driving behavior / methods that will reduce emissions are beyond the scope of project, but will be far more effective in reducing the pollutant levels.

### 8.2.3. Air Quality Monitoring

Apart from provision of the mitigation measures, their effectiveness and further improvement in designs to reduce the air pollution with increase in traffic shall be monitored. The monitoring plan shall be functional in construction as well as in operation stages. The frequency, duration and responsibility will be as per the EMAP. Any value/result not within standard/acceptable values of National Ambient Air Quality Standards will be reported to the Engineer, for remedial measures.

### 8.3. Land Environment – Mitigation Measures

Land acquisition, soil erosion, and contamination of soil have emerged as major sources of impacts to land, especially in urban areas and nearby watercourses. Due to proposed road improvements aimed at enhancing the efficiency of road transport system, which will result in economic growth in the region overtime. Summary of potential impact and mitigation measures proposed is mentioned below:

Sr. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Change in Topography	Marginal impact	Due to embankment raising.	Embankment rising to relieve water logging.
2	Change in Geology	Direct , long term, negative impact	Extraction of materials (borrow earth, coarse & fine aggregates).	no blasting is envisaged quarry redevelopment plan need to be enforced
3	Change in Seismology	No Negative Impact		Cross drainage structures are checked and complied with the seismological settings of the region (Zone)
4	Change in Land environment			
a	Loss of land	Direct, long-term negative impact	Land Acquisition Change in land use pattern	Land acquisition to be minimized with provision of Retaining walls.
b	Generation of Debris	Negative Impact	May contaminate air, water and land, if not disposed properly.	disposed properly to avoid contamination
c	Soil Erosion	Moderate, direct, long-term negative impact	Road slopes and spoils  Construction of new bridges and culverts Quarry and Borrow areas	Embankment protection. For Emb. ht. >3m Stone pitching, Emb. ht. <3m Turfing. Residual spoil need to be disposed properly. Silt Fencing need to be provided. Quarries need to be reclaimed
5	Contamination of Soil	Direct, long term negative impact	Scarified bitumen wastes  Oil & diesel Spills Emulsion sprayer and laying of hot	Hazardous Wastes (Management and Handling) Rules, 1989 to be enforced. Oil Interceptor will be provided for accidental spill of oil and diesel.

			<p>mix Production of hot mix and rejected materials</p> <p>Residential facilities for the labor and officers Routine and periodical maintenance</p>	<p>Rejected material will be layed in village roads or as directed by engineer.</p> <p>Septic tank will be construction for waste disposal.</p>
6	Soil quality - monitoring		<p>Effectiveness / shortfall (if any) Any unforeseen impact</p>	<p>Measures will be revised &amp; improved to mitigate/ enhance environment due to any unforeseen impact.</p>

### 8.3.1. Change in Topography – Mitigation

#### Construction Phase

- Care shall be taken during embankment construction and cutting process, so that the natural drainage pattern in the areas will not be affected and adjacent flora should not be affected.
- On high terrain, construction of retaining wall should be carried out by adopting suitable scientific technique so that minimum changes can occur on geography.
- Rehabilitation of borrow area and quarry area shall be carried out in order to control the water logging problem and to avoid the soil erosion and landslides of the adjacent area.
- Guidelines presented in IRC:SP -48-1998 – Hill Road Manual should be followed for construction of road in hilly sections

### 8.3.2. Change in Geology – Mitigation

#### Construction Phase

No new quarry has been proposed for the project requirements. Only existing, live, licensed quarry will be used as source of coarse and fine aggregates. It will be ensured that the aggregates procured during construction stage will be from the authorized or licensed suppliers only. In case of use of any new quarry by contractor, the instruction / procedure as detailed in **Annexure 3.3** of EMP Report will be applicable. The instruction / procedure for taking earth from borrow areas are detailed in **Annexure 3.4** of EMP Report.

### 8.3.3. Change in Seismology – Mitigation

As indicated in the previous chapter, there will be no impact on the seismological setting of the region. Rather, as part of the project all the existing structures will be checked and constructed as per seismological requirement of the region in conformity to the IRC 6,2000 guidelines.

### 8.3.4. Change in Land Environment – Mitigation

**Loss of Land:** As far as possible, the land acquisition has been kept to the minimum, by restricting the geometric improvement within the existing right of way. Details of the land required for project

road up-gradation is presented in **Table 7.2**. However, the land acquisition will be done at sections having width, insufficient to accommodate the approved cross-sections & geometric improvements. The land acquisition would be in accordance with the RAP and entitlement framework. All R&R activities are to be completed before starting the construction.

**Debris Generation:** Due to the removal of structures (residential and commercial), pavement scarification and cross drainage structures, lot of debris will generate, which need to be disposed properly to avoid contamination of land and water. For safe and environmental friendly disposal of waste debris, instruction/procedure has been specified in **Annexure 3.5** of EMP Report.

**Soil Erosion:** could cause severe negative impact if not dealt with, in time, as this harms the environment in two ways, firstly it erodes the top soil and secondly it spoils the resource where it settles, mostly water course. Hence, soil erosion cause loss of top-soil and contamination of water bodies/sources/channels. Mitigation measures proposed are below.

#### Construction Phase

- To prevent the soil erosion from embankment, the slopes have been restricted to some extent.
- Turfing of road embankment slopes, development of compensatory afforestation, Borrow area rehabilitation will control the soil erosion to a great extent.
- The topsoil from all areas of cutting and all other areas to be permanently covered, shall be stripped to a specified depth of 150 mm and stored in stockpiles of height not exceeding 2m.
- The stored topsoil will be spread back to restore the productivity of the exhausted borrow areas. Also the accumulated soil will be utilized for developing median plantation and raising turfs in the embankment slopes.
- The device for checking soil erosion include the formulation of sediment basins, slope drains etc. Such works and maintenance thereof will be deemed as incidental to the earthwork.
- In borrow pits, the depth of the pit should be regulated so that the sides of the excavation will have a slope not steeper than 1 vertical to 4 horizontal from the edge of the final section of bank.
- If operating from temporarily hired land, it should be ensured that the topsoil for agriculture remains preserved & not get compacted.

#### Operation Phase

- Compaction and Landscaping to be carried out at all embankment developed locations to control the soil erosion during operation phase.

### 8.3.5. Contamination of Soil – Mitigation

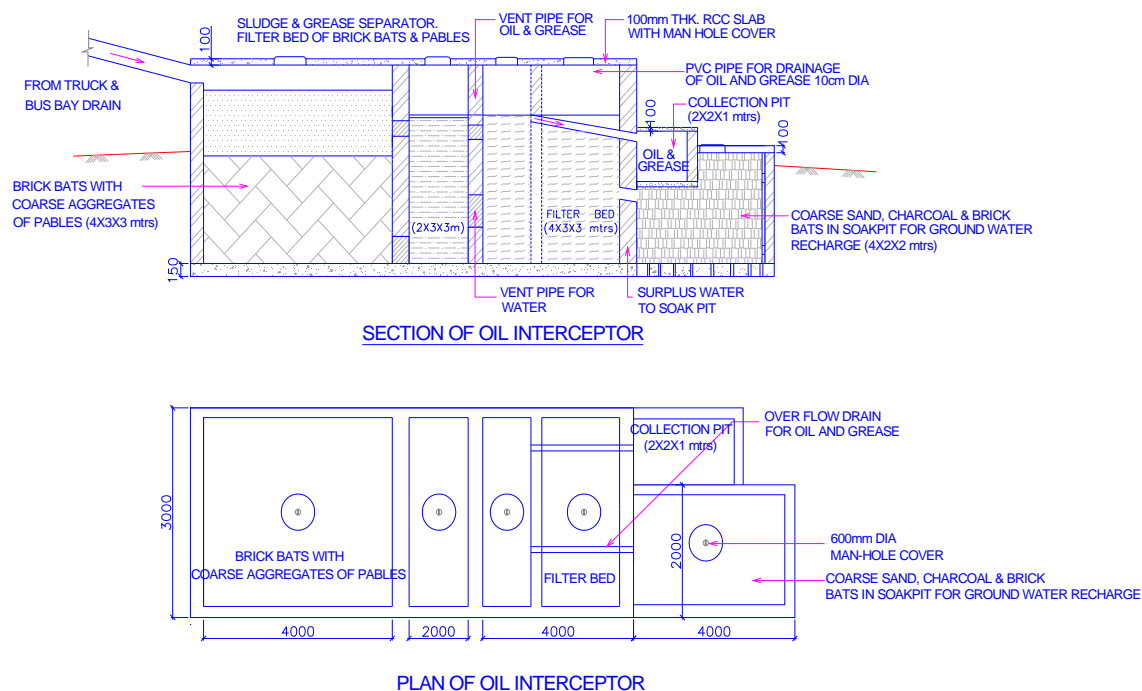
Contamination of soil can spoil the soil and can also contaminate the surface as well as ground water sources. Details of the activities from which the contamination can occur are presented below;

**Table 8.2. List of Potential Impacts on Soil and its Mitigation/Enhancement Measures**

Potential Impact	Mitigation/Enhancement
Scarified bitumen wastes, Excess production of hot mix and rejected materials.	Scarified waste and excess/rejected hot mix, with the consent of village authority, will be used in village roads construction.

Potential Impact	Mitigation/Enhancement
Debris generated from dismantling of structures.	A comprehensive list of instructions/procedures has been suggested in <b>Annexure 3.5</b> of EMP Report, for contractor to adhere to for safe and environmental friendly disposal of debris.
Maintenance of the machinery and operation of the diesel generator sets on site	The base of all machinery, generators will be paved and all the waste/spill will be drained to oil interceptor before discharging.
Oil Spill from the operation of the diesel pumps and diesel storage, during transportation and transfer, parking places, and diesel generator sets	Figure of oil interceptor is presented below.
Operation of the emulsion sprayer and laying of hot mix	Proper demarcation of the surface to be sprayed /paved will be done to minimize the excessive spread of emulsion/hot mix.
Operation of the residential facilities for the labour and officers	The residential facilities will be provided with proper sanitation, and planned setup of construction camp. Comprehensive plans of Labour camp and construction camp are presented in <b>Annexure 3.1</b> and <b>3.2</b> of EMP Report.
Storage and stock yards of bitumen and emulsion	The base of bitumen/emulsion stock yard will be paved and all the waste/spill will be drained to oil interceptor before discharging.

**Oil Interceptor:** Oil and grease from polluting run-off is another major concern. During construction, discharge of oil and grease is most likely from workshops, oil and waste oil storage areas, diesel oil pumps, vehicle parking areas from the construction camps. Vehicle / machinery and equipment maintenance and refueling will be carried out so that spillage of fuel and lubricants do not contaminate the soil. The soil is well defined and restricted. An “oil interceptor” will be provided for wash down and refueling areas. Fuel storage will be in proper bunded areas. All spills and collected petroleum products will be disposed off in accordance with MoEF&CC and SPCB guidelines. Fuel storage and fuelling areas will be located at least 300 m from all cross drainage structures and significant water bodies. Schematic diagram of oil interceptor is presented in below.



**Drawing No. 8.1: Conceptual Plan of Oil Interceptor**

### 8.3.6. Soil Quality Monitoring

Apart from provision of the mitigation measures, their effectiveness and further improvement in design to reduce the concentration of pollutants in the soil due to construction activity shall be monitored, as contamination of soil is directly linked with contamination of water. The monitoring plan shall be functional in construction as well as in operation stages. The frequency, duration and responsibility will be as per the Environmental Monitoring Plan.

## 8.4. Water Environment – Mitigation Measures

Due to the proposed project, there will be some direct and indirect long-term impacts on the water resources. Mitigation measures suggested for those impacts are discussed below. Table below presents the major adverse impacts on the water resources and the mitigation measures taken

Sr. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Loss of water Bodies	Major, direct impact	Part or complete acquisition of source of water	Land acquisition to be minimized with provision of Retaining walls. Relocation of ground/surface water sources.
2	Alteration of Cross Drainage	Very Low Impact	One major bridge over existing causeway. Widening of minor bridges and culverts.	widening of minor bridges and bridging of existing causeways, there will be an improvement in the drainage characteristics of the project area
3	Runoff and	Direct	Siltation of water	Silt fencing to be provided.



Sr. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
	drainage	Impact	bodies Reduction in ground recharge.  Increased drainage discharge	Recharge well to be provided to compensate the loss of pervious surface. Continuous drain is provided, unlined in rural area and lined in urban areas.
4	Water requirement for project	Direct Impact	Water requirement for construction activity. Water requirement of labour.	Contractor needs to obtain approvals for taking adequate quantities of water from surface and ground water sources. This is required to avoid depletion of water resources
5	Water Quality			
a	Increased sedimentation	Direct impact	increased sediment laden run-off alter the nature & capacity of the watercourse	Silt fencing to be provided.  Refer Annexure 3.45 of EMP Report for typical design of sedimentation trenches.
b	Contamination of Water	Direct adverse impact	Scarified bitumen wastes Oil & diesel Spills Emulsion sprayer and laying of hot mix Production of hot mix and rejected materials Residential facilities for the labor and officers Routine and periodical maintenance	Hazardous Wastes (Management and Handling) Rules, 1989 to be enforced. Oil Interceptor will be provided for accidental spill of oil and diesel.  Rejected material will be layed in village roads or as directed by engineer.  Septic tank will be construction for waste disposal.
6	Water quality - monitoring		Effectiveness / shortfall (if any) Any unforeseen impact	Measures will be revised & improved to mitigate/ enhance environment due to any unforeseen impact.

## 8.4.1. Loss of Water Bodies - Mitigation

### 8.4.1.1. Surface Water Bodies – Mitigation

The project road is crossing rivers, canals and streams on its way and is abutting lakes, ponds and tanks, wells, bore wells, etc. Suggested mitigation measures for those impacts identified in **Section 7.5.1.1.** are listed below.

**Table 8.3. Surface Water Bodies – Mitigation**

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>						
1	57+080	Water Tap	LHS	7	Direct Impact	Will be Relocated
2	57+100	Water Tank	RHS	8	Direct Impact	Will be Relocated
3	57+170	Water Tap	LHS	7	Direct Impact	Will be Relocated
4	57+160	Water Tap	RHS	6	Direct Impact	Will be Relocated
5	57+240	Water Tap	LHS	5	Direct Impact	Will be Relocated
6	57+300	Water Tank	LHS	7	Direct Impact	Will be Relocated
7	57+400	Water Tank	LHS	7	Direct Impact	Will be Relocated
8	57+710	Water Tap	LHS	7	Direct Impact	Will be Relocated
9	57+730	Water Tap	LHS	7	Direct Impact	Will be Relocated
10	57+770	Water Tap	LHS	7	Direct Impact	Will be Relocated
11	57+800	Water Tap	LHS	7	Direct Impact	Will be Relocated
12	58+000	Water Tap	LHS	5	Direct Impact	Will be Relocated
13	58+200	Over Head Tank	RHS	14	No Direct Impact	
14	58+200	Water Tap	LHS	7	Direct Impact	Will be Relocated
15	58+250	Water Tap	LHS	5	Direct Impact	Will be Relocated
16	56+280	Water Tap	LHS	5	Direct Impact	Will be Relocated
17	59+180	Water Tap	RHS	8	Direct Impact	Will be Relocated
18	59+560	Water Tap	RHS	6	Direct Impact	Will be Relocated
19	59+680	Water Tap	RHS	6	Direct Impact	Will be Relocated
20	59+755	Water Tap	RHS	7	Direct Impact	Will be Relocated
21	59+860	Water Tap	LHS	7	Direct Impact	Will be Relocated
22	59+870	Water Tap	LHS	7	Direct Impact	Will be Relocated
23	59+890	Water Tap	LHS	6	Direct Impact	Will be Relocated
24	60+400	Over Head Tank	RHS	12	No Direct Impact	
25	60+470	Water Tank	LHS	8	Direct Impact	Will be Relocated
26	60+500	Water Tap	RHS	8	Direct Impact	Will be Relocated
27	63+570	Water Tap	RHS	9	Direct Impact	Will be Relocated
28	64+400	Water Tank	LHS	10	No Direct Impact	
29	65+150	Water Tank	LHS	7	No Direct Impact	
30	65+400	Water Tap	LHS	10	No Direct Impact	
31	65+340	Water Tap	LHS	9	Direct Impact	Will be Relocated
32	65+340	Water Tap	RHS	8	Direct Impact	Will be Relocated
33	65+350	Water Tap	LHS	8	Direct Impact	Will be Relocated
34	65+350	Water Tap	RHS	7	Direct Impact	Will be Relocated
35	65+360	Water Tap	LHS	8	Direct Impact	Will be Relocated
36	65+360	Water Tap	RHS	7	Direct Impact	Will be Relocated
37	65+380	Water Tap	LHS	8	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
38	65+380	Water Tap	RHS	7	Direct Impact	Will be Relocated
39	65+700	Water Tap	RHS	12	Direct Impact	Will be Relocated
40	65+720	Water Tap	RHS	9	Direct Impact	Will be Relocated
41	65+790	Water Tap	RHS	9	Direct Impact	Will be Relocated
42	65+800	Water Tank	RHS	7	Direct Impact	Will be Relocated
43	66+200	Water Tank	LHS	7	Direct Impact	Will be Relocated
44	66+380	Water Tap	RHS	11	No Direct Impact	
45	66+500	Water Tank	RHS	7	No Direct Impact	
46	66+880	Water Tap	RHS	20	No Direct Impact	
47	68+060	Water Tap	LHS	6	Direct Impact	Will be Relocated
48	68+100	Water Tap	LHS	6	Direct Impact	Will be Relocated
49	68+150	Water Tank	LHS	7	Direct Impact	Will be Relocated
50	69+380	Water Tap	LHS	6	Direct Impact	Will be Relocated
51	69+450	Over Head Tank	RHS	15	Direct Impact	Will be Relocated
52	70+000	Over Head Tank	LHS	15	No Direct Impact	
53	70+100	Water Tap	LHS	9	Direct Impact	Will be Relocated
54	70+260	Water Tap	RHS	8	No Direct Impact	
55	71+650	Water Tank	RHS	7	Direct Impact	Will be Relocated
56	72+040	Water Tap	LHS	10	Direct Impact	Will be Relocated
57	73+000	Over Head Tank	LHS	15	No Direct Impact	
58	73+160	Water Tap	LHS	10	Direct Impact	Will be Relocated
59	74+180	Water Tap	LHS	9	No Direct Impact	
60	74+450	Water Tap	LHS	8	Direct Impact	Will be Relocated
61	74+500	Water Tap	LHS	7	Direct Impact	Will be Relocated
62	74+500	Water Tap	RHS	9	No Direct Impact	
63	74+520	Water Tap	LHS	11	No Direct Impact	
64	75+000	Water Tap	RHS	17	No Direct Impact	
65	79+380	Water Tap	RHS	8	Direct Impact	Will be Relocated
66	79+430	Water Tap	LHS	8	Direct Impact	Will be Relocated
67	79+450	Water Tap	LHS	7	Direct Impact	Will be Relocated
68	79+450	Over Head Tank	RHS	15	Direct Impact	Will be Relocated
69	79+900	Water Tap	RHS	7	Direct Impact	Will be Relocated
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>						
1	0+020	Water Tank	RHS	9	No Direct Impact	
2	0+020	Over Head tank	RHS	15	No Direct Impact	
3	0+300	Water Tank	RHS	7	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
4	0+500	Water Tank	RHS	16	No Direct Impact	
5	1+620	Water Tank	RHS	8	Direct Impact	Will be Relocated
6	2+000	Water Tap	RHS	5.5	Direct Impact	Will be Relocated
7	2+020	Water Tap	RHS	8	Direct Impact	Will be Relocated
8	2+140	Water Tap	RHS	6	Direct Impact	Will be Relocated
9	2+160	Water Tap	RHS	8	Direct Impact	Will be Relocated
10	2+180	Over head tank	RHS	12	No Direct Impact	
11	4+000	Water Tank	LHS	14	No Direct Impact	
12	4+120	Water Tap	LHS	6	Direct Impact	Will be Relocated
13	4+135	Water Tap	LHS	6	Direct Impact	Will be Relocated
14	4+410	Water Tank	RHS	7	Direct Impact	Will be Relocated
15	4+520	Water Tap	LHS	6	Direct Impact	Will be Relocated
16	4+580	Water Tap	LHS	7	Direct Impact	Will be Relocated
17	4+580	Water Tap	RHS	4	Direct Impact	Will be Relocated
18	4+600	Water Tap	LHS	5	Direct Impact	Will be Relocated
19	4+610	Water Tap	LHS	6	Direct Impact	Will be Relocated
20	4+620	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
21	4+650	Water Tap	LHS	7	Direct Impact	Will be Relocated
22	4+700	Water Tap	LHS	5	Direct Impact	Will be Relocated
23	5+990	Water Tank	RHS	8	Direct Impact	Will be Relocated
24	6+200	Water Tap	LHS	8	Direct Impact	Will be Relocated
25	6+250	Water Tap	RHS	7	Direct Impact	Will be Relocated
26	6+270	Water Tap	RHS	7	Direct Impact	Will be Relocated
27	6+500	Water Tap	RHS	7	Direct Impact	Will be Relocated
28	6+580	Water Tap	LHS	8	Direct Impact	Will be Relocated
29	6+590	Water Tap	LHS	8	Direct Impact	Will be Relocated
30	6+700	Water Tap	RHS	7	Direct Impact	Will be Relocated
31	6+740	Water Tap	RHS	7	Direct Impact	Will be Relocated
32	6+900	Water Tap	RHS	7	No Direct Impact	
33	7+200	Water Tap	RHS	8	Direct Impact	Will be Relocated
34	7+650	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
35	7+760	Water Tap	LHS	7	Direct Impact	Will be Relocated
36	8+050	Water Tank	LHS	10	Direct Impact	Will be Relocated
37	8+060	Water Tap	LHS	8	Direct Impact	Will be Relocated
38	8+060	Water Tap	RHS	7	Direct Impact	Will be Relocated
39	8+680	Water Tank	RHS	24	No Direct Impact	
40	8+680	Water Tap	LHS	6	Direct Impact	Will be Relocated
41	9+170	Water Tap	LHS	6	Direct Impact	Will be Relocated
42	9+180	Water Tap	LHS	6	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
43	9+190	Water Tap	LHS	5	Direct Impact	Will be Relocated
44	9+330	Water Tap	LHS	6	Direct Impact	Will be Relocated
45	9+340	Water Tap	LHS	6	Direct Impact	Will be Relocated
46	9+350	Water Tank	LHS	6	Direct Impact	Will be Relocated
47	9+420	Water Tap	LHS	7	Direct Impact	Will be Relocated
48	9+590	Water Tap	LHS	7	Direct Impact	Will be Relocated
49	9+650	Water Tap	LHS	5	Direct Impact	Will be Relocated
50	9+900	Water Tank	LHS	11.5	No Direct Impact	
51	10+200	Water Tank	LHS	7	Direct Impact	Will be Relocated
52	10+620	Water Tank	LHS	5	No Direct Impact	
53	11+000	Water Tank	LHS	10	Direct Impact	Will be Relocated
54	11+250	Water Tank	LHS	5.5	Direct Impact	Will be Relocated
55	11+600	Water Tank	LHS	10	Direct Impact	Will be Relocated
56	11+910	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
57	11+920	Water Tap	LHS	5	Direct Impact	Will be Relocated
58	11+950	Water Tap	LHS	5	Direct Impact	Will be Relocated
59	11+950	Water Tap	RHS	5.5	Direct Impact	Will be Relocated
60	12+000	Over head tank	LHS	12	No Direct Impact	
61	12+000	Water Tap	LHS	5	Direct Impact	Will be Relocated
62	12+045	Water Tap	RHS	4	Direct Impact	Will be Relocated
63	12+050	Water Tap	RHS	4	Direct Impact	Will be Relocated
64	12+070	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
65	12+080	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
66	12+080	Water Tap	RHS	6	Direct Impact	Will be Relocated
67	12+090	Water Tap	LHS	5	Direct Impact	Will be Relocated
68	12+100	Water Tap	RHS	5	Direct Impact	Will be Relocated
69	12+100	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
70	12+100	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
71	12+110	Water Tap	LHS	5	Direct Impact	Will be Relocated
72	12+130	Water Tap	LHS	5	Direct Impact	Will be Relocated
73	12+130	Water Tap	RHS	5	Direct Impact	Will be Relocated
74	12+140	Water Tap	LHS	5	Direct Impact	Will be Relocated
75	12+150	Water Tap	LHS	5	Direct Impact	Will be Relocated
76	12+160	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
77	12+160	Water Tap	RHS	5	Direct Impact	Will be Relocated
78	12+165	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
79	12+170	Water Tap	RHS	6	Direct Impact	Will be Relocated
80	12+200	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
81	12+200	Water Tap	RHS	4	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
82	12+230	Water Tap	RHS	4	Direct Impact	Will be Relocated
83	12+250	Water Tap	RHS	5	Direct Impact	Will be Relocated
84	12+255	Water Tap	RHS	5	Direct Impact	Will be Relocated
85	12+265	Water Tank	LHS	6	Direct Impact	Will be Relocated
86	12+300	Over head tank	LHS	15	No Direct Impact	
87	12+310	Water Tap	RHS	7	Direct Impact	Will be Relocated
88	12+580	Water Tap	LHS	5	Direct Impact	Will be Relocated
89	13+080	Water Tank	LHS	15	No Direct Impact	
90	13+100	Water Tank	LHS	15	No Direct Impact	
91	14+070	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
92	14+100	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
93	14+120	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
94	14+500	Water Tank	LHS	18	No Direct Impact	
95	15+150	Water Tap	RHS	7.5	Direct Impact	Will be Relocated
96	15+170	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
97	15+300	Water Tap	LHS	6	Direct Impact	Will be Relocated
98	15+320	Water Tap	LHS	6.5	Direct Impact	Will be Relocated
99	15+410	Water Tap	LHS	5	Direct Impact	Will be Relocated
100	15+900	Water Tap	LHS	10	No Direct Impact	
101	16+250	Water Tank	LHS	8	No Direct Impact	
102	17+650	Water Tank	RHS	6	Direct Impact	Will be Relocated
103	17+680	Water Tap	RHS	7	Direct Impact	Will be Relocated
104	17+790	Water Tap	RHS	5	Direct Impact	Will be Relocated
105	17+815	Water Tap	RHS	6	Direct Impact	Will be Relocated
106	17+825	Water Tap	LHS	8.5	Direct Impact	Will be Relocated
107	17+920	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
108	17+970	Water Tank	RHS	7	Direct Impact	Will be Relocated
109	18+020	Water Tap	LHS	6	Direct Impact	Will be Relocated
110	18+375	Water Tap	LHS	6.5	Direct Impact	Will be Relocated
111	18+645	Water Tap	LHS	7	Direct Impact	Will be Relocated
112	18+790	Water Tap	LHS	6	Direct Impact	Will be Relocated
113	18+820	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
114	19+005	Water Tap	LHS	6.5	Direct Impact	Will be Relocated
115	19+020	Water Tap	LHS	7	Direct Impact	Will be Relocated
116	19+205	Water Tap	LHS	6.5	Direct Impact	Will be Relocated
117	19+420	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
118	19+520	Water Tap	LHS	5.5	Direct Impact	Will be Relocated
119	19+540	Water Tap	LHS	7.5	Direct Impact	Will be Relocated
120	19+560	Water Tap	LHS	7.5	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
121	19+750	Water Tap	LHS	8	Direct Impact	Will be Relocated
122	19+950	Water Tank	LHS	13.4	No Direct Impact	
123	20+600	Over head tank	RHS	8.5	Direct Impact	Will be Relocated
124	20+620	Water Tap	RHS	8.5	Direct Impact	Will be Relocated
125	20+660	Water Tank	RHS	7	Direct Impact	Will be Relocated
126	20+725	Water Tap	RHS	8	Direct Impact	Will be Relocated
127	20+760	Water Tap	RHS	5	Direct Impact	Will be Relocated
128	20+900	Over head tank	RHS	12	No Direct Impact	
129	21+500	Water Tap	RHS	8	Direct Impact	Will be Relocated
130	21+600	Water Tank	RHS	5	Direct Impact	Will be Relocated
131	21+700	Water Tap	RHS	6	Direct Impact	Will be Relocated
132	21+710	Water Tap	RHS	8.5	Direct Impact	Will be Relocated
133	21+720	Water Tap	RHS	7.5	Direct Impact	Will be Relocated
134	21+730	Water Tap	RHS	7	Direct Impact	Will be Relocated
135	21+740	Water Tap	RHS	7	Direct Impact	Will be Relocated
136	21+750	Water Tap	RHS	7	Direct Impact	Will be Relocated
137	21+760	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
138	21+770	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
139	21+780	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
140	21+790	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
141	21+800	Water Tap	RHS	5.5	Direct Impact	Will be Relocated
142	21+810	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
143	21+820	Water Tap	RHS	8	Direct Impact	Will be Relocated
144	21+950	Water Tank	RHS	6.5	Direct Impact	Will be Relocated
145	24+100	Water Tap	LHS	8	No Direct Impact	
146	24+940	Water Tap	RHS	5	Direct Impact	Will be Relocated
147	25+000	Water Tap	RHS	8	No Direct Impact	
148	25+007	Water Tap	RHS	6	Direct Impact	Will be Relocated
149	27+250	Water Tap	LHS	6.5	Direct Impact	Will be Relocated
150	28+055	Water Tank	LHS	15	No Direct Impact	
151	28+550	Water Tap	RHS	5.5	Direct Impact	Will be Relocated
152	28+600	Water Tap	RHS	7	Direct Impact	Will be Relocated
153	28+620	Water Tap	RHS	5.5	Direct Impact	Will be Relocated
154	28+750	Water Tap	RHS	7	Direct Impact	Will be Relocated
155	28+760	Water Tap	LHS	6	Direct Impact	Will be Relocated
156	28+860	Water Tap	RHS	9	No Direct Impact	
157	29+100	Water Tap	LHS	6.5	No Direct Impact	
158	29+150	Water Tap	RHS	7	No Direct Impact	
159	29+170	Water Tap	RHS	7	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
160	29+200	Over head tank	LHS	12	No Direct Impact	
161	30+400	Water Tap	LHS	8	No Direct Impact	
162	30+410	Water Tap	LHS	9	No Direct Impact	
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>						
1	51+950	Over head tank	LHS	8	Direct Impact	Will be Relocated
2	52+010	Water Tank	RHS	6.5	Direct Impact	Will be Relocated
3	52+980	Water tap	RHS	5	Direct Impact	Will be Relocated
4	53+080	Water Tap	RHS	7.5	Direct Impact	Will be Relocated
5	53+330	Water Tap	LHS	7	Direct Impact	Will be Relocated
6	53+500	Water Tap	RHS	7	Direct Impact	Will be Relocated
7	53+700	Water tap	LHS	4	Direct Impact	Will be Relocated
8	53+700	Water tap	LHS	4.5	Direct Impact	Will be Relocated
9	54+230	Water Tap	LHS	8	Direct Impact	Will be Relocated
10	54+450	Water Tap	LHS	5	Direct Impact	Will be Relocated
11	54+700	Water Tap	LHS	7	Direct Impact	Will be Relocated
12	54+750	Water Tap	RHS	4	Direct Impact	Will be Relocated
13	54+765	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
14	54+780	Water Tap	RHS	4	Direct Impact	Will be Relocated
15	54+910	Water Tap	LHS	4	Direct Impact	Will be Relocated
16	54+960	Water Tap	LHS	4	Direct Impact	Will be Relocated
17	54+990	Water Tap	LHS	4	Direct Impact	Will be Relocated
18	55+000	Water Tap	LHS	4	Direct Impact	Will be Relocated
19	55+010	Water Tap	LHS	4	Direct Impact	Will be Relocated
20	55+030	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
21	55+030	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
22	55+040	Water Tap	RHS	5	Direct Impact	Will be Relocated
23	55+050	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
24	55+050	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
25	55+055	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
26	55+060	Water Tap	LHS	4	Direct Impact	Will be Relocated
27	55+060	Water Tap	RHS	4	Direct Impact	Will be Relocated
28	55+065	Water Tap	LHS	4	Direct Impact	Will be Relocated
29	55+070	Water Tap	LHS	4	Direct Impact	Will be Relocated
30	55+075	Water Tap	LHS	4	Direct Impact	Will be Relocated
31	55+085	Water Tap	LHS	4	Direct Impact	Will be Relocated
32	55+100	Water Tap	RHS	4	Direct Impact	Will be Relocated
33	55+110	Water Tap	RHS	4	Direct Impact	Will be Relocated
34	55+150	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
35	55+153	Water Tap	LHS	4.5	Direct Impact	Will be Relocated



Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
36	55+190	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
37	55+190	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
38	55+200	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
39	55+200	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
40	55+205	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
41	55+210	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
42	55+215	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
43	55+225	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
44	55+310	Water Tap	RHS	5	Direct Impact	Will be Relocated
45	55+315	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
46	55+320	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
47	55+330	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
48	55+350	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
49	55+365	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
50	55+375	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
51	55+400	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
52	55+420	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
53	55+450	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
54	55+460	Water Tap	LHS	4.5	Direct Impact	Will be Relocated
55	55+465	Water Tap	RHS	4.5	Direct Impact	Will be Relocated
56	55+530	Water Tap	RHS	7	Direct Impact	Will be Relocated
57	55+540	Water Tap	RHS	7	Direct Impact	Will be Relocated
58	55+580	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
59	55+900	Water Tank	LHS	7	Direct Impact	Will be Relocated
60	57+050	Over head tank	RHS	7	Direct Impact	Will be Relocated
61	57+800	Water Tap	LHS	5	Direct Impact	Will be Relocated
62	57+810	Water Tank	RHS	5	Direct Impact	Will be Relocated
63	57+820	Water Tap	LHS	5	Direct Impact	Will be Relocated
64	59+200	Water Tank	LHS	9	Direct Impact	Will be Relocated
65	59+400	Water Tap	LHS	8	Direct Impact	Will be Relocated
66	59+450	Water Tank	LHS	5	Direct Impact	Will be Relocated
67	59+460	Water Tap	LHS	9	Direct Impact	Will be Relocated
68	59+500	Water Tap	LHS	6	Direct Impact	Will be Relocated
69	60+250	Water Tank	RHS	6	Direct Impact	Will be Relocated
70	60+500	Water tank	LHS	5	Direct Impact	Will be Relocated
71	61+100	Over head tank	RHS	10	Direct Impact	Will be Relocated
72	61+300	Water Tap	LHS	10	Direct Impact	Will be Relocated
73	61+300	Water tank	LHS	7	Direct Impact	Will be Relocated
74	62+250	Over head	RHS	6	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
		tank				
75	62+700	Water Tap	LHS	8	Direct Impact	Will be Relocated
76	62+980	Water Tap	LHS	8	Direct Impact	Will be Relocated
77	63+500	Water Tap	LHS	7	Direct Impact	Will be Relocated
78	63+500	Water Tap	LHS	7	Direct Impact	Will be Relocated
79	63+505	Water Tap	LHS	6	Direct Impact	Will be Relocated
80	63+510	Water Tap	LHS	6	Direct Impact	Will be Relocated
81	63+520	Water Tap	LHS	6	Direct Impact	Will be Relocated
82	63+530	Water Tap	LHS	5	Direct Impact	Will be Relocated
83	63+540	Water Tap	LHS	5	Direct Impact	Will be Relocated
84	63+540	Water Tap	RHS	6	Direct Impact	Will be Relocated
85	63+550	Water Tap	LHS	5	Direct Impact	Will be Relocated
86	63+560	Water Tap	LHS	5	Direct Impact	Will be Relocated
87	63+570	Water Tap	RHS	5	Direct Impact	Will be Relocated
88	63+590	Water Tap	LHS	5	Direct Impact	Will be Relocated
89	63+590	Water Tap	LHS	5	Direct Impact	Will be Relocated
90	63+600	Water Tap	RHS	4	Direct Impact	Will be Relocated
91	63+600	Water Tap	RHS	5	Direct Impact	Will be Relocated
92	63+610	Water Tap	LHS	5	Direct Impact	Will be Relocated
93	63+610	Water Tap	RHS	5	Direct Impact	Will be Relocated
94	63+650	Water Tap	LHS	5	Direct Impact	Will be Relocated
95	63+660	Water Tap	RHS	7	Direct Impact	Will be Relocated
96	63+665	Water Tap	RHS	6	Direct Impact	Will be Relocated
97	63+665	Water Tap	RHS	6	Direct Impact	Will be Relocated
98	63+720	Water Tap	LHS	6	Direct Impact	Will be Relocated
99	63+740	Water Tap	LHS	6	Direct Impact	Will be Relocated
100	63+800	Water Tap	LHS	7	Direct Impact	Will be Relocated
101	63+805	Water Tap	LHS	7	Direct Impact	Will be Relocated
102	63+820	Water Tap	RHS	7	Direct Impact	Will be Relocated
103	63+820	Water Tap	RHS	7	Direct Impact	Will be Relocated
104	63+920	Water Tap	LHS	7	Direct Impact	Will be Relocated
105	63+920	Water Tap	RHS	8	Direct Impact	Will be Relocated
106	63+930	Water Tap	RHS	8	Direct Impact	Will be Relocated
107	63+930	Water Tap	LHS	7	Direct Impact	Will be Relocated
108	63+930	Water Tap	LHS	7	Direct Impact	Will be Relocated
109	63+950	Water Tap	RHS	7	Direct Impact	Will be Relocated
110	64+030	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
111	64+090	Water Tap	LHS	6	Direct Impact	Will be Relocated
112	64+130	Water Tap	LHS	6	Direct Impact	Will be Relocated
113	64+190	Water Tap	RHS	7	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
114	64+190	Water Tap	LHS	6	Direct Impact	Will be Relocated
115	64+210	Water Tap	RHS	6	Direct Impact	Will be Relocated
116	64+215	Water Tap	RHS	6	Direct Impact	Will be Relocated
117	65+190	Water Tap	LHS	7	Direct Impact	Will be Relocated
118	65+300	Water Tap	LHS	7	Direct Impact	Will be Relocated
119	65+600	Water Tap	RHS	7	Direct Impact	Will be Relocated
120	65+700	Water tank	RHS	6	Direct Impact	Will be Relocated
121	67+300	Over head tank	RHS	8	Direct Impact	Will be Relocated
122	70+610	Water Tap	RHS	5	Direct Impact	Will be Relocated
123	70+610	Water Tap	LHS	5	Direct Impact	Will be Relocated
124	70+620	Water Tap	RHS	6	Direct Impact	Will be Relocated
125	70+630	Water Tap	LHS	5	Direct Impact	Will be Relocated
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>						
1	1+050	Water Tank	RHS	7	Direct Impact	Will be Relocated
2	1+180	watrer tap	LHS	9	Direct Impact	Will be Relocated
3	1+410	Water Tap	LHS	12	No Direct Impact	
4	1+630	Water Tank	LHS	10	No Direct Impact	
5	1+680	Over Head Tank	RHS	13	No Direct Impact	
6	1+950	Water Tap	RHS	8	Direct Impact	Will be Relocated
7	1+900	Water Tap	RHS	9	Direct Impact	Will be Relocated
8	1+950	Water Tap	RHS	9	No Direct Impact	
9	3+100	Water Tank	RHS	17	No Direct Impact	
10	3+450	Water Tap	RHS	11	Direct Impact	Will be Relocated
11	5+250	Water Tap	LHS	6	Direct Impact	Will be Relocated
12	5+350	Water Tap	RHS	5	Direct Impact	Will be Relocated
13	6+400	Water Tank	LHS	15	No Direct Impact	
14	6+900	Water Tap	RHS	5	Direct Impact	Will be Relocated
15	7+195	Water Tap	RHS	5	Direct Impact	Will be Relocated
16	7+380	Water Tap	RHS	15	No Direct Impact	
17	7+380	Over Head Tank	RHS	15	No Direct Impact	
18	7+540	Water Tap	RHS	6.5	Direct Impact	Will be Relocated
19	8+190	Water tap	RHS	5	Direct Impact	Will be Relocated
20	8+420	Over Head Tank	LHS	13	No Direct Impact	
21	8+700	Water Tap	LHS	14	No Direct Impact	
22	8+700	Water Tap	RHS	7	Direct Impact	Will be Relocated
23	9+900	Over Head Tank	RHS	30	No Direct Impact	
24	9+990	Water Tap	LHS	7	Direct Impact	Will be Relocated

Sl. No.	Chainage (Km.)	Name of Surface water Source	Location (Left / Right)	Distance from ECL (in mts)	Impact	Mitigation / Enhancement
25	11+570	Water Tank	RHS	10	Direct Impact	Will be Relocated
26	11+610	Water Tap	RHS	10	Direct Impact	Will be Relocated
27	12+000	Over Head Tank	RHS	20	No Direct Impact	

#### Construction Phase

- All affected community water supply systems such as deep tube wells, open wells, bore , pipelines, taps etc. will be rehabilitated in such a way that local public should not be disturbed for daily water use due to project activity. Relocation of these water systems should be carried out in consultation with concerned government departments and the owners.
- Precautions shall be taken during the construction work of culverts and bridges across these rivers and streams such that the flow in these water bodies is not obstructed.
- At hilly areas, appropriate drainage arrangements with catch drain will be provided to avoid the stagnating of water on carriageway.
- Any embankment work in low lying areas will have provisions for cross drainage for natural drains to ensure that flow is not affected.
- Pitching, stabilization of soil and slope protection measures should be taken up to reduce erosion of soils and to achieve slope stability.
- Arrangement for supply and storage of water shall be made by the contractor in such a way that the water availability and supply to nearby communities remain unaffected. If a new tube-well is to be bored, proper sanction and approval by Ground Water Department is needed.
- The wastage of water during the construction should be minimized. In case of tapping water from community sources, consent to be obtained from local administration for the same.
- Guidelines presented in IRC:SP -42-1994 – “Guidelines for Road Drainage” and IRC: 36 – 1974 – “Recommended Practice for Treatment of Embankment Slopes for Erosion Control” should be followed for construction of drainages and embankments for the proposed project.

#### Operation Phase

- Landscaping to be developed on embankment slopes so that soil erosion and siltation of natural drain can be avoided.
- Appropriate drainage arrangements with catch drains and catch pits designed to safely drain out the hazardous chemicals should be provided.
- For delivery of hazardous substances, permit license, driving license and guarding license issued by Transport Department to be maintained.
- Vehicles carrying hazardous substances should display mandatory safety signs
- In case of spillage, it should be reported to relevant department and their instructions should be followed
- Cleaning of the spills at the accidental site should be carried out as per regulations.

- Care shall be taken by the contractor to avoid the disposal of construction debris and domestic waste along the project area.
- Regular checkup shall be made to clear the blockages and silts from the drainage facilities.
- Permission shall be obtained from Irrigation Department to draw water from natural water bodies for maintenance of avenue trees.

#### 8.4.1.2. Ground Water Resources - Mitigation

Any source of community water (potable or otherwise) such as open wells, ponds, bore wells and tube wells will include the ground water resources. Suggested mitigation measures for those impacts identified in **Section 7.5.1.2.** are listed below.

**Table 8.4 Ground Water Sources – Mitigation**

Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
Tiruchengode to Paramathy Section of Road No. 2 (SH 86)						
1	55+000	Bore Well	LHS	10	Direct Impact	Will be Relocated
2	55+160	Bore Well	RHS	10	Direct Impact	Will be Relocated
3	55+170	Open Well	RHS	5	Direct Impact	Will be Relocated
4	55+440	Bore Well	RHS	5	Direct Impact	Will be Relocated
5	57+070	Bore Well	RHS	8	Direct Impact	Will be Relocated
6	57+420	Bore Well	LHS	15	No Direct Impact	
7	57+480	Hand Pump	RHS	6	Direct Impact	Will be Relocated
8	57+510	Bore Well	RHS	6	Direct Impact	Will be Relocated
9	57+590	Bore Well	RHS	7	Direct Impact	Will be Relocated
10	57+760	Hand Pump	LHS	7	Direct Impact	Will be Relocated
11	58+960	Open Well	RHS	5	Direct Impact	Will be Relocated
12	59+065	Bore Well	LHS	7	Direct Impact	Will be Relocated
13	59+130	Bore Well	LHS	6	Direct Impact	Will be Relocated
14	60+360	Open Well	LHS	13	Direct Impact	Will be Relocated
15	60+360	Bore Well	LHS	10	Direct Impact	Will be Relocated
16	60+415	Bore Well	RHS	10	Direct Impact	Will be Relocated
17	60+490	Bore Well	RHS	6	Direct Impact	Will be Relocated
18	60+700	Bore Well	RHS	9	Direct Impact	Will be Relocated
19	62+250	Bore Well	RHS	10	Direct Impact	Will be Relocated
20	64+300	Bore Well	RHS	8	Direct Impact	Will be Relocated
21	64+400	Open Well	LHS	10.5	No Direct Impact	
22	64+640	Bore Well	RHS	17	No Direct Impact	
23	65+030	Open Well	RHS	6	Direct Impact	Will be Relocated
24	65+120	Bore Well	LHS	11	No Direct Impact	
25	65+795	Bore Well	RHS	9	Direct Impact	Will be Relocated
26	66+020	Hand Pump	RHS	7	Direct Impact	Will be Relocated
27	66+360	Bore Well	RHS	20	No Direct Impact	
28	67+050	Open Well	RHS	13	No Direct Impact	

Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
29	67+275	Open Well	LHS	15	No Direct Impact	
30	67+840	Open Well	RHS	8	Direct Impact	Will be Relocated
31	67+920	Open Well	LHS	14	No Direct Impact	
32	67+930	Bore Well	LHS	23	No Direct Impact	
33	68+080	Open Well	LHS	9	Direct Impact	Will be Relocated
34	68+140	Bore Well	LHS	5	Direct Impact	Will be Relocated
35	68+340	Bore Well	LHS	5	Direct Impact	Will be Relocated
36	68+430	Open Well	LHS	20	No Direct Impact	
37	69+920	Bore Well	RHS	9	No Direct Impact	
38	69+940	Bore Well	LHS	14	No Direct Impact	
39	69+950	Bore Well	LHS	25	No Direct Impact	
40	70+130	Open Well	RHS	17	No Direct Impact	
41	70+230	Open Well	LHS	15	No Direct Impact	
42	70+350	Bore Well	RHS	8	Direct Impact	Will be Relocated
43	71+470	Bore Well	LHS	15	No Direct Impact	
44	71+570	Open Well	LHS	18	No Direct Impact	
45	72+700	Open Well	LHS	15	No Direct Impact	
46	72+800	Open Well	RHS	17	No Direct Impact	
47	74+180	Bore Well	RHS	11	No Direct Impact	
48	76+320	Open Well	RHS	19	No Direct Impact	
49	76+500	Open Well	LHS	11	Direct Impact	Will be Relocated
50	76+750	Bore Well	RHS	8	Direct Impact	Will be Relocated
51	76+840	Bore Well	LHS	9	Direct Impact	Will be Relocated
52	77+210	Bore Well	LHS	11	No Direct Impact	
53	79+160	Hand Pump	LHS	7	Direct Impact	Will be Relocated
54	79+720	Open Well	RHS	17	No Direct Impact	
55	80250	Open Well	RHS	10	Direct Impact	Will be Relocated
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>						
1	0+020	Open well	RHS	10	No Direct Impact	
2	0+030	Hand Pump	RHS	7	Direct Impact	Will be Relocated
3	0+800	Bore well	LHS	8	Direct Impact	Will be Relocated
4	0+880	Open well	LHS	21	No Direct Impact	
5	1+100	Bore well	LHS	5.5	Direct Impact	Will be Relocated
6	1+210	Pump House	LHS	8	Direct Impact	Will be Relocated
7	1+250	Pump House	RHS	6	Direct Impact	Will be Relocated
8	1+500	Bore well	LHS	7	Direct Impact	Will be Relocated
9	1+600	Bore well	RHS	8	Direct Impact	Will be Relocated
10	1+820	Open well	LHS	15	No Direct Impact	
11	2+170	Bore well	RHS	10.5	No Direct Impact	
12	2+280	Open well	LHS	14	No Direct Impact	

Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
13	2+370	Bore well	LHS	13	No Direct Impact	
14	3+430	Hand pump	RHS	4	Direct Impact	Will be Relocated
15	4+410	Bore well	RHS	4	Direct Impact	Will be Relocated
16	6+120	Open well	RHS	11	No Direct Impact	
17	7+450	Hand pump	LHS	7	Direct Impact	Will be Relocated
18	8+100	Open well	LHS	20	No Direct Impact	
19	9+060	Open well	LHS	25	No Direct Impact	
20	9+080	Open well	RHS	16	No Direct Impact	
21	9+480	Hand pump	LHS	5	Direct Impact	Will be Relocated
22	10+100	Open well	RHS	14	No Direct Impact	
23	10+200	Bore Well	LHS	5	Direct Impact	Will be Relocated
24	10+660	Open well	RHS	13	No Direct Impact	
25	11+000	Open well	RHS	11	No Direct Impact	
26	13+250	Open well	LHS	23	No Direct Impact	
27	13+280	Open well	RHS	35	No Direct Impact	
28	13+720	Bore well	LHS	16	No Direct Impact	
29	14+400	Open well	LHS	7	Direct Impact	Will be Relocated
30	14+450	Bore well	LHS	12	No Direct Impact	
31	14+540	Open well	RHS	24	No Direct Impact	
32	14+660	Open well	LHS	49	No Direct Impact	
33	15+010	Open well	RHS	12	No Direct Impact	
34	15+500	Bore well	LHS	6	Direct Impact	Will be Relocated
35	15+820	Bore well	RHS	22	No Direct Impact	
36	16+050	Open well	LHS	12	No Direct Impact	
37	16+860	Bore well	RHS	27	No Direct Impact	
38	16+980	Bore well	RHS	35	No Direct Impact	
39	17+240	Bore well	RHS	37	No Direct Impact	
40	17+280	Open well	LHS	15	No Direct Impact	
41	17+420	Open well	RHS	12	No Direct Impact	
42	17+530	Open well	RHS	25	No Direct Impact	
43	18+230	Bore well	LHS	24	No Direct Impact	
44	18+240	Open well	LHS	25	No Direct Impact	
45	18+270	Open well	RHS	23	No Direct Impact	
46	18+360	Open well	RHS	10	No Direct Impact	
47	18+360	Open well	LHS	17	No Direct Impact	
48	18+500	Open well	RHS	32	No Direct Impact	
49	18+750	Open well	LHS	11	No Direct Impact	
50	18+960	Bore well	LHS	40	No Direct Impact	
51	19+180	Open well	LHS	12	No Direct Impact	
52	19+680	Bore well	RHS	30	No Direct Impact	

Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
53	19+790	Bore well	LHS	5.5	Direct Impact	Will be Relocated
54	19+990	Bore well	LHS	17	No Direct Impact	
55	20+160	Open well	LHS	19	No Direct Impact	
56	20+180	Open well	LHS	13	No Direct Impact	
57	20+600	Open well	RHS	20	No Direct Impact	
58	20+610	Bore well	RHS	11	No Direct Impact	
59	20+700	Bore well	LHS	19	No Direct Impact	
60	20+950	Pump House	RHS	6	Direct Impact	Will be Relocated
61	21+050	Bore well	RHS	5	Direct Impact	Will be Relocated
62	21+210	Bore well	RHS	5	Direct Impact	Will be Relocated
63	21+760	Open well	LHS	35	No Direct Impact	
64	21+820	Open well	LHS	20	No Direct Impact	
65	21+980	Open well	LHS	16	No Direct Impact	
66	22+060	Open well	LHS	24	No Direct Impact	
67	22+700	Open well	LHS	18	No Direct Impact	
68	22+960	Open well	LHS	25	No Direct Impact	
69	23+000	Hand pump	LHS	6	Direct Impact	Will be Relocated
70	23+560	Open well	LHS	14	No Direct Impact	
71	23+760	Open well	LHS	16	No Direct Impact	
72	23+800	Open well	LHS	19	No Direct Impact	
73	24+200	Bore well	RHS	5.5	Direct Impact	Will be Relocated
74	24+260	Open well	LHS	37	No Direct Impact	
75	24+300	Open well	RHS	23	No Direct Impact	
76	24+510	Open well	LHS	30	No Direct Impact	
77	24+510	Bore well	LHS	30	No Direct Impact	
78	25+100	Open well	RHS	10	No Direct Impact	
79	25+130	Open well	LHS	13	No Direct Impact	
80	25+240	Open well	RHS	15	No Direct Impact	
81	25+260	Bore well	RHS	18	No Direct Impact	
82	25+610	Open well	LHS	34	No Direct Impact	
83	25+800	Open well	LHS	10	No Direct Impact	
84	25+800	Open well	LHS	21	No Direct Impact	
85	25+870	Bore well	LHS	22	No Direct Impact	
86	26+015	Open well	LHS	9	No Direct Impact	
87	26+180	Open well	RHS	13	No Direct Impact	
88	26+350	Bore well	RHS	28	No Direct Impact	
89	26+740	Bore well	LHS	29	No Direct Impact	
90	26+790	Bore well	RHS	7	No Direct Impact	
91	26+795	Bore well	RHS	8	No Direct Impact	
92	27+730	Open well	LHS	19	No Direct Impact	

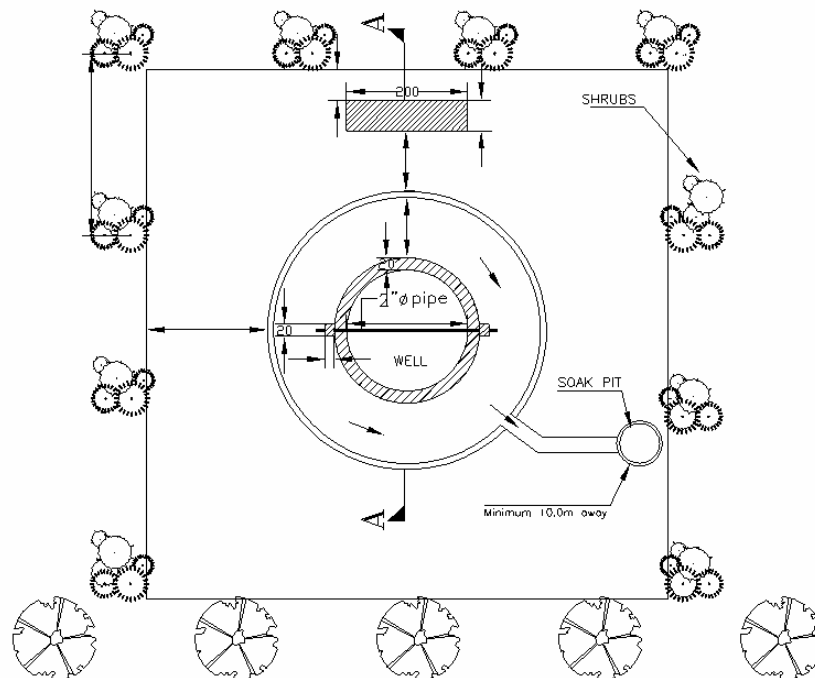
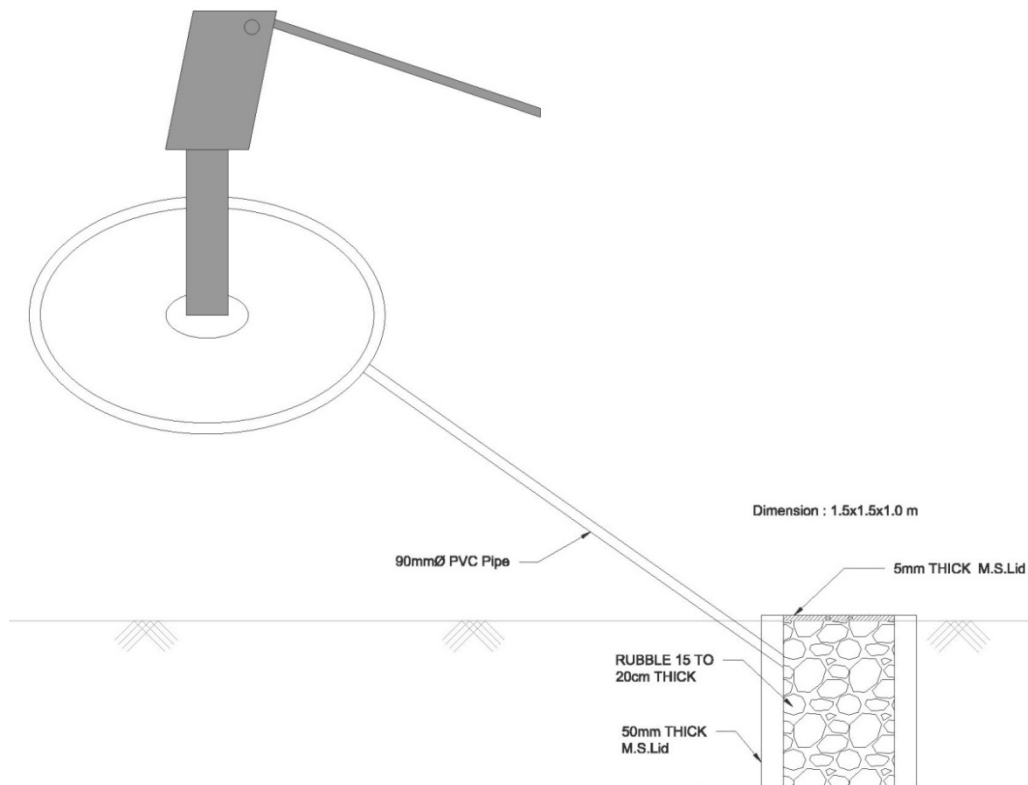


Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
93	28+400	Bore well	RHS	15	No Direct Impact	
94	28+900	Open well	LHS	30	No Direct Impact	
95	29+040	Open well	LHS	12	No Direct Impact	
96	29+270	Hand pump	LHS	5.5	Direct Impact	Will be Relocated
97	30+640	Open well	LHS	23	No Direct Impact	
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>						
1	52+010	Open well	RHS	6	Direct Impact	Will be Relocated
2	52+590	Open well	LHS	8	Direct Impact	Will be Relocated
3	52+615	Open well	LHS	8	Direct Impact	Will be Relocated
4	52+850	Open well	RHS	8	Direct Impact	Will be Relocated
5	52+980	Open well	RHS	8	Direct Impact	Will be Relocated
6	53+980	Hand pump	LHS	5	Direct Impact	Will be Relocated
7	54+020	Hand pump	LHS	4	Direct Impact	Will be Relocated
8	54+100	Hand pump	LHS	4.5	Direct Impact	Will be Relocated
9	54+650	Hand pump	LHS	5	Direct Impact	Will be Relocated
10	55+100	Hand pump	LHS	4	Direct Impact	Will be Relocated
11	55+110	Open well	LHS	4.5	Direct Impact	Will be Relocated
12	55+510	Bore well	LHS	6	Direct Impact	Will be Relocated
13	55+580	Bore well	LHS	5	Direct Impact	Will be Relocated
14	55+590	Hand pump	LHS	4.5	Direct Impact	Will be Relocated
15	55+620	Bore well	RHS	8	Direct Impact	Will be Relocated
16	56+550	Hand pump	LHS	5	Direct Impact	Will be Relocated
17	56+920	Open well	RHS	7	Direct Impact	Will be Relocated
18	57+060	Hand pump	RHS	4	Direct Impact	Will be Relocated
19	57+100	Open well	LHS	15	No Direct Impact	
20	57+530	Open well	LHS	10	Direct Impact	Will be Relocated
21	57+590	Hand pump	LHS	5	Direct Impact	Will be Relocated
22	57+800	Open well	RHS	15	No Direct Impact	
23	57+810	Bore well	RHS	5	Direct Impact	Will be Relocated
24	59+100	Pump House	RHS	5	Direct Impact	Will be Relocated
25	59+150	Hand pump	RHS	5	Direct Impact	Will be Relocated
26	59+300	Bore well	LHS	9	Direct Impact	Will be Relocated
27	59+300	Open well	LHS	9	Direct Impact	Will be Relocated
28	59+450	Bore well	LHS	5	Direct Impact	Will be Relocated
29	60+100	Bore well	RHS	4.5	Direct Impact	Will be Relocated
30	60+500	Bore well	LHS	5	Direct Impact	Will be Relocated
31	60+510	Hand pump	RHS	4.5	Direct Impact	Will be Relocated
32	60+520	Bore well	LHS	4	Direct Impact	Will be Relocated
33	61+190	Open well	LHS	8	Direct Impact	Will be Relocated
34	62+580	Bore well	RHS	4.5	Direct Impact	Will be Relocated

Sl. No	Chainage (Km)	Name of Ground water Source	Location (Left / Right)	Distance from ECL (m)	Impact	Mitigation/Enhancement
35	62+610	Bore well	RHS	4.5	Direct Impact	Will be Relocated
36	62+690	Open well	LHS	9	Direct Impact	Will be Relocated
37	62+990	Bore well	LHS	7	Direct Impact	Will be Relocated
38	65+410	Bore well	RHS	4.5	Direct Impact	Will be Relocated
39	69+350	Bore well	RHS	5	Direct Impact	Will be Relocated
40	69+600	Bore well	RHS	4.5	Direct Impact	Will be Relocated
41	70+200	Pump House	RHS	7	Direct Impact	Will be Relocated
42	70+890	Open well	RHS	8	Direct Impact	Will be Relocated
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>						
1	1+380	Open Well	LHS	12	No Direct Impact	
2	1+630	Bore Well	LHS	7	Direct Impact	Will be Relocated
3	2+920	Open Well	LHS	5	Direct Impact	Will be Relocated
4	4+020	Hand Pump	RHS	7	Direct Impact	Will be Relocated
5	6+400	Open Well	RHS	5	No Direct Impact	
6	6+500	Open Well	LHS	16	No Direct Impact	
7	7+400	Bore Well	RHS	15	No Direct Impact	
8	7+750	Open Well	LHS	15	No Direct Impact	
9	7+800	Open Well	LHS	15	No Direct Impact	
10	7+820	Open Well	LHS	16	No Direct Impact	
11	8+100	Hand Pump	RHS	7	Direct Impact	Will be Relocated
12	8+430	Bore Well	RHS	4	Direct Impact	Will be Relocated
13	10+000	Bore Well	RHS	5	Direct Impact	Will be Relocated

#### Construction Phase

- Requisite permission shall be obtained from the Central Ground Water Board to utilise the water for construction and domestic use.
- Sources of ground water affected during widening will be rebuilt in consultation with concerned govt. officials and the owners.
- Soak pits shall be provided near hand pumps and water tanks present along the project roads for water supply so that spilled water can be used for ground water recharge. This will also avoid unhygienic conditions around such water sources. The drawing for soak pit is given below.



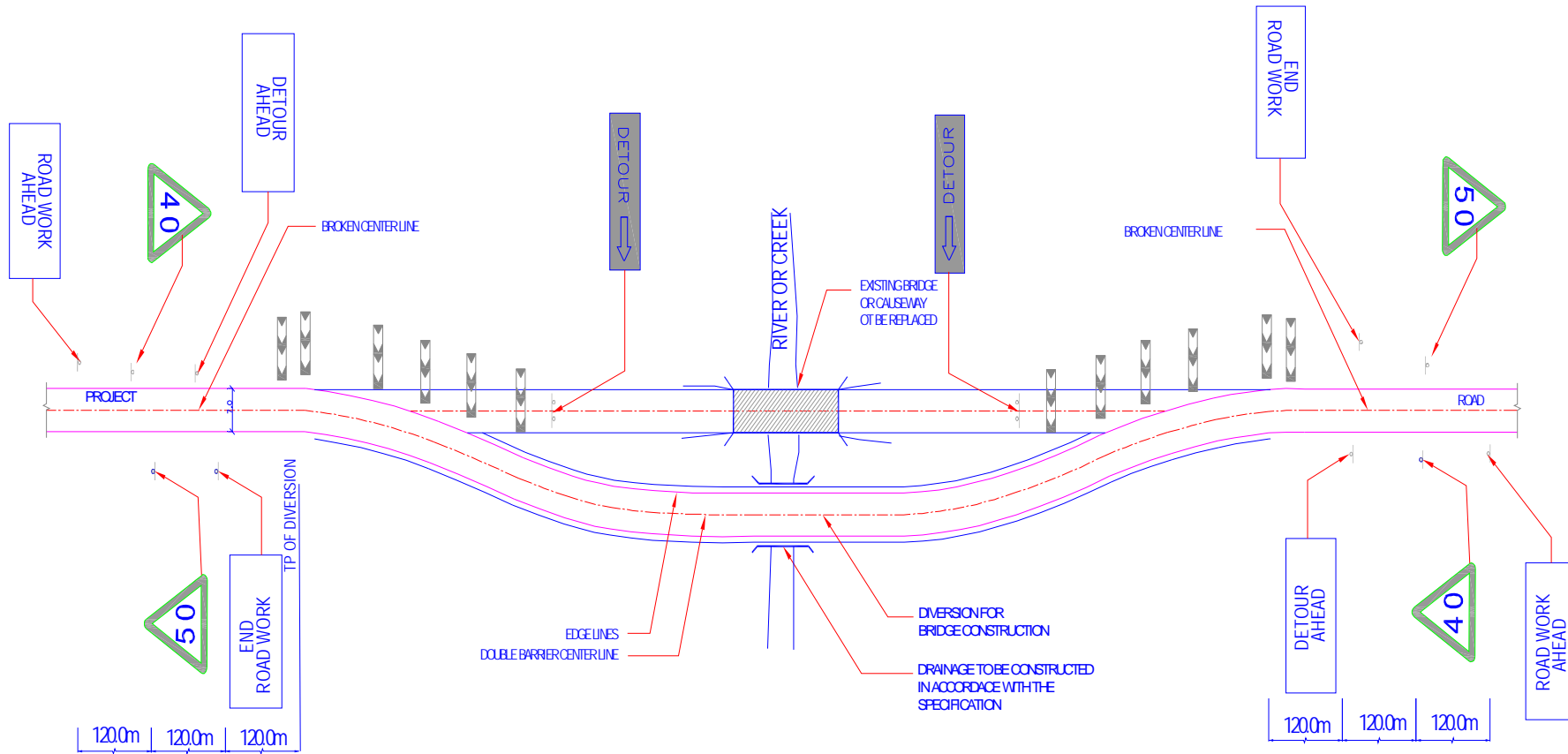
**Drawing No. 8.2. Conceptual Plan of Soak Pit for Hand Pumps and Water Tanks (Syntex Tanks) along the roads in Village and Urban Areas**

#### Operation Phase

- Runoff water from project road shall be directed to ground water recharge pits through adequate storm water and catch drainage systems.
- Construction of Ground Water Recharge pit shall enhance the ground water level along the available margin of land within the RoW along the project influence area.

#### **8.4.2. Alteration of Cross Drainage – Mitigation**

- All cross drainage structures have been designed to handle a 50-year peak flood level. A detailed hydrological study had been carried to calculate the design discharge.
- Pipe drainages will be provided for diversion roads constructed for the construction of new bridges and culverts (refer drawing 8.3).
- Storm water from all longitudinal and cross drainage works will be connected to the natural drainage courses.
- The contractor will remove obstruction that may cause temporary flooding of local drainage channels, during the construction phase.
- Contractor will be responsible removal of debris due to the dismantling of structure and earth generated due to the excavation of foundation, from the water course before the onset of monsoon.



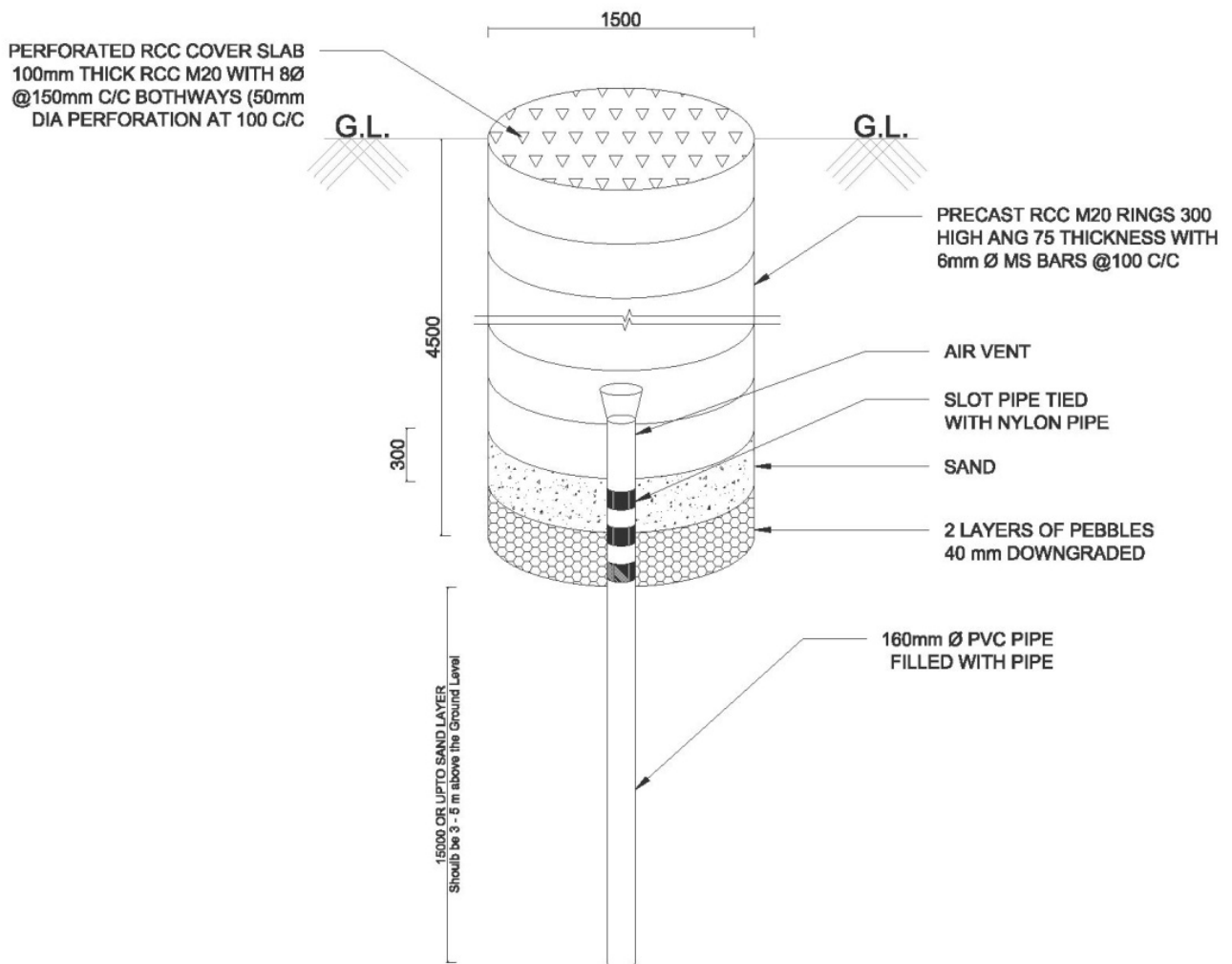
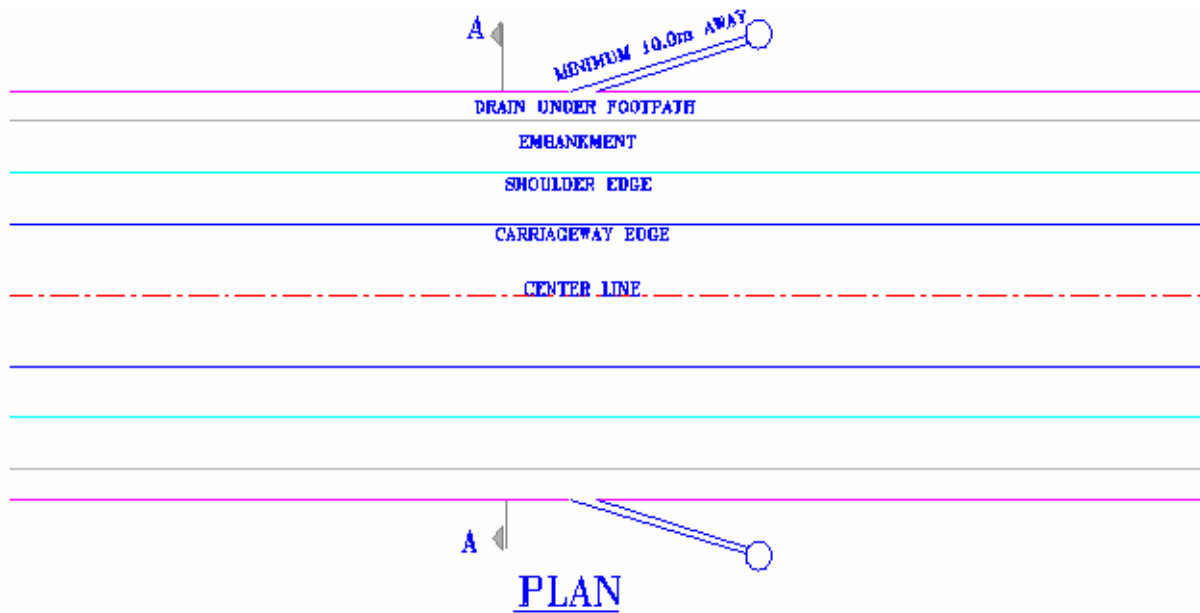
**Drawing No. 8.3: Conceptual Plan of Diversion at Bridge Location**

### 8.4.3. Runoff and Drainage Changes – Mitigation

- Continuous drain (lined/unlined) is provided throughout the project road for efficient drainage of storm water
- Lined drain is provided at builtup location for quick drainage of storm water
- The increased runoff due to increased impervious (bituminous top) surface will be countered by providing rainwater harvesting pits along the roads, at 500 m interval alternatively on both sides, connected to the drains through PVC pipes. The pits should be at least 3 - 5 m above the highest ground water table. The schematic diagram of rainwater harvesting pit is presented below. These structures shall be provided only in rural areas due to land constrain at built up areas as well as to ensure safety of pedestrians.
- The local bodies need to discourage / stop the filling of private water bodies, ponds etc. to develop commercial places and shops due to the improved roads and improved connectivity.

**Table 8.5. Locations of Drains in Rural Area**

Sl No	Chainage		Length	No of Recharge pits*
	From	To		
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>				
1	54+800	59+396	9.192	9
2	59+995	63+395	6.8	7
3	66+492	69+892	6.8	7
4	70+592	73+992	6.8	7
5	74+992	79+192	8.4	8
6	79+990	80+590	1.2	1
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>				
1	0+400	4+350	7.9	8
2	4+900	6+200	2.6	3
3	6+600	11+700	10.2	10
4	15+200	17+600	4.8	5
5	19+000	20+500	3	3
6	22+000	22+500	1	1
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>				
1	51+400	54+490	6.18	6
2	55+425	61+919	12.988	13
3	64+892	71+188	12.592	13
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>				
1	2+050	2+450	0.8	1
2	2+450	2+800	0.7	1
3	4+310	5+070	1.52	2
4	5+400	6+300	1.8	2
5	6+530	6+950	0.84	1
6	6+950	7+830	1.76	2
7	8+230	9+870	3.28	3
8	10+100	10+730	1.26	1
9	10+730	11+030	0.6	1
10	11+030	12+500	2.94	3
11	12+850	13+200	0.7	1



**Drawing No. 8.4: Conceptual Plan of Rainwater Harvesting Pit at Connected to Drains at Every 500m Interval Alternatively on Both Sides in Rural Areas**

## **8.4.4. Water Requirement for Project – Mitigation**

Acquisition and management of water for construction is an issue that must be addressed by the contractor. The Contractor is expected to obtain water for construction purposes that is of a high water quality.

- Contractor needs to obtain approvals for taking adequate quantities of water from surface and ground water sources. This is required to avoid depletion of water resources.
- Contractor is required to minimise wastage of water.
- Water conservation methods to be adopted during construction process to make optimum use of water, as limited water sources are available along the project roads.

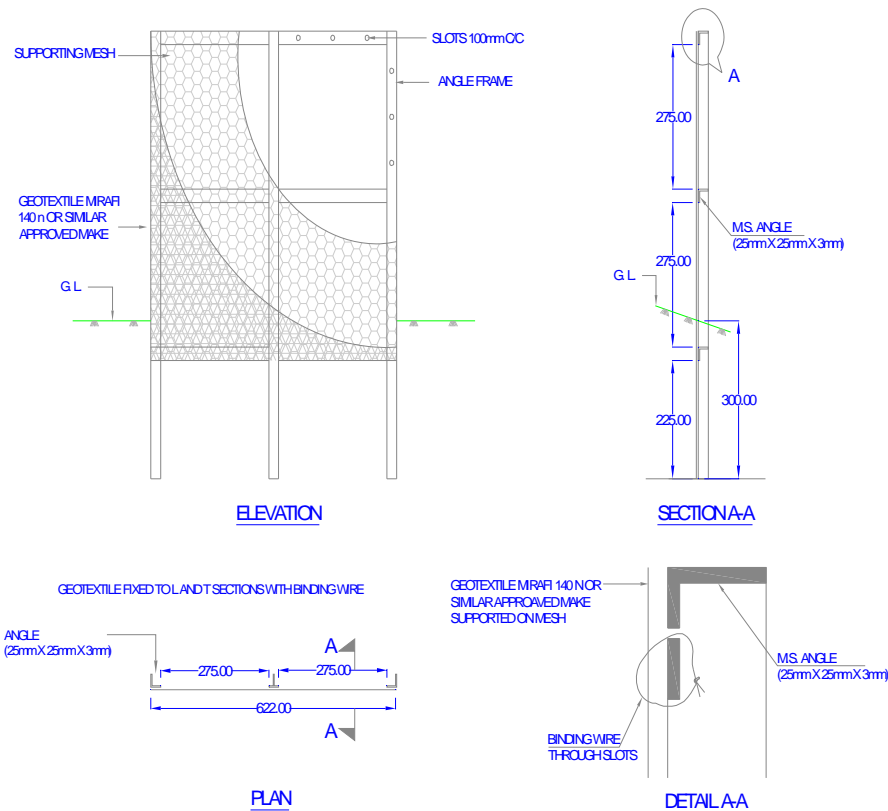
## **8.4.5. Water Pollution - Mitigation**

### **8.4.5.1. Surface Water Quality**

#### Construction Phase

- Suitable silt screen and sedimentation traps should be provided to the drains, to minimise the turbidity and silting in natural drainage.
- Piling activity for bridge construction shall be carried out during non-monsoon season.
- Washing of construction equipment, machineries and vehicles used for transporting materials should be strictly prohibited in rivers, nalas and other water bodies.
- The worker's camp must not be located within 1km from the dense builtup areas and water reserves.
- Runoff from the construction camps including workshops and vehicle garages should be passed through catch drain followed by oil interceptors (**Section 8.3.5**).
- Adequate sanitary facilities, drainage, washing and toilet facilities with septic tanks and refuse collection and disposal systems should be provided to the workers. The provision of water supply and toilet facilities should be made as per the stipulated guidelines in the Indian Labour Act.
- Construction debris and domestic waste should be collected, stored, transported and disposed safely to the approved land fill site identified for the project.
- Awareness program for workers and proper training to the personal handling oil, paints and lubricants and vehicle repairing employees, to respond immediately to spillages of hazardous materials shall be provided by contractors.
- Guidelines presented in IRC: SP -42-1994 – “Guidelines for Road Drainage” and IRC: 36 – 1974 – “Recommended Practice for Treatment of Embankment Slopes for Erosion Control” should be followed for construction of drainages and embankments for the proposed project.
- Water quality monitoring shall be conducted as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement of pollution.





**Drawing No. 8.5: Concept Plan of Silt Fencing**

#### Operation Phase

- Appropriate drainage arrangements with catch drains and catch pits designed to safely drain out the hazardous chemicals should be provided.

#### 8.4.5.2. Ground Water Quality

#### Construction Phase

- The construction camp must not be located within 1km from the dense builtup areas and water reserves.
- Runoff from the construction camps including workshops and vehicle garages should be passed through catch drain followed by oil interceptors (**Section 8.3.5**) finally utilized for dust suppression at construction camp.
- Water quality monitoring should be conducted as per Environmental Monitoring Plan so that appropriate measures are taken up towards abatement of pollution.

#### 8.4.6. Water Quality Monitoring

Apart from provision of the mitigation measures, their effectiveness and further improvement in designs to reduce the concentration of pollutants in the soil due to construction activity shall be monitored, as contamination of soil is directly linked with contamination of water. The monitoring plan shall be functional in construction as well as in operation stages. Water Quality Monitoring shall be conducted as per the monitoring plan in EMP.

## 8.5. Noise Environment – Mitigation Measures

Environmental noise particularly highway traffic noise, is a complex phenomenon because its intensity and characteristics vary with time depending upon the frequency as well as type of vehicles. Suggested mitigation measures for the impacts identified in **Section 7.6.** are listed below.

**Table 8.6. Noise Impacts and Mitigation Measures**

Sr. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Sensitive receptors	Direct impact	Increase in noise pollution	Noise barrier to be provided Traffic calming devices to be used. NO Horn Zone sign Post.
2a	Noise Pollution (Pre-Construction Stage)	Direct impact, short duration	Man, material & machinery movements  Establishment of labor camps onsite offices, stock yards and construction plants	Area specific and for short duration Machinery to be checked & complied with noise pollution regulations. Camps to be setup away from the settlements, in the down wind direction.
2b	Noise Pollution (Construction Stage)	Marginal Impact	stone crushing, asphalt production plant and batching plants, diesel generators etc  Community residing near to the work zones	Camps to be setup away from the settlements, in the down wind direction. Noise pollution regulation to be monitored and enforced. Temporary as the work zones will be changing with completion of construction
2c	Noise Pollution (Operation Stage)	Marginal Impact	due to increase in traffic (due to improved facility)	will be compensated with the uninterrupted movement of heavy and light vehicles till the facility reaches the level of service C.
3	Noise Pollution Monitoring		Effectiveness / shortfall (if any) Any unforeseen impact	Measures will be revised & improved to mitigate/ enhance environment due to any unforeseen impact.

### 8.5.1. Impacts on Sensitive Receptors – Mitigation

All schools, hospitals and cultural properties have been identified and those that are close to the project roads will require noise barrier (2 m concrete wall and plantation of mast trees (*Polyalthia longifolia*) at 1.5m interval behind the wall) to accommodate the long-term impact of the improved road. Use of horns should be restricted at sensitive locations like schools and hospitals through the use of appropriate signboards along the road. Use of air horns should be minimized during night.

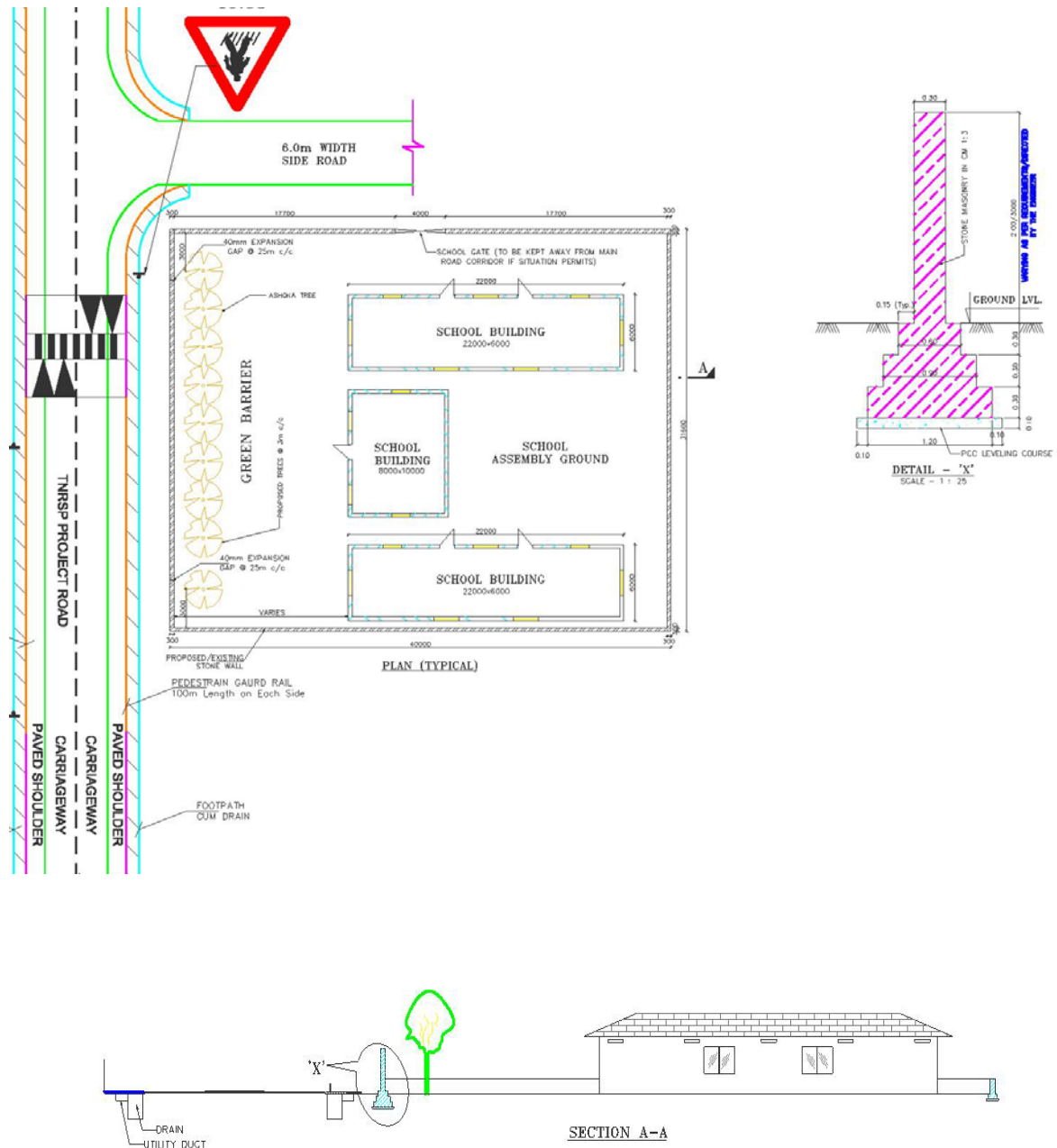
**Table 8.7. List of Sensitive Noise Receptors and Mitigation Measures**

Sl. No.	Chainage (Km.)	Name of Sensitive receptor	Location (Left / Right)	Distance from Exist CL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>								
1	56+100	Alpha institute of Management-Tiruchengodu	RHS	8	70	44	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
2	61+700	VIB Matriculation Higher secondary -Peechapalayam	LHS	10	330	174	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
3	64+500	SKV HSS, Maniyanoor	RHS	100	278	252	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
4	64+900	Government Higher Secondary School, Kandampalayam	LHS	13	108	165	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
5	65+750	Government Public Health Center, Kandampalayam	RHS	10	80	35	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
6	66+400	Government Veterinary Hospital	RHS	18	50	45	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
7	67+300	Panchayat Union Elementary School, Nallur	RHS	14	50	30	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
8	67+380	Panchayath Library, Nallur	RHS	20	50	22	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
9	69+200	Panchayat Union Middle School, Bommakapalayam	RHS	11	50	40	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
10	74+300	Sri Rama Murthi High School	RHS	9.5			No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
11	76+400	Panchayat Union Elementary School, Ardhanaripalayam	LHS	20	80	50	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
12	77+700	Sivabakkiam Muthusamy H.S.S	RHS	20	214	156	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
13	78+700	New Dawn School & Hospital	RHS	14	236	190	No direct impact	Additional Noise barrier with Mast trees (Nettilingam trees)
14	79+200	Panchayat Union Elementary School	LHS	8			Compound wall affected	New Compound Wall (Noise barrier) will be constructed
15	80+200	Public Library	LHS	9			No Direct	Additional Noise barrier with

Sl. No.	Chainage (Km.)	Name of Sensitive receptor	Location (Left / Right)	Distance from Exist CL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
							Impact	Mast trees (Nettilingam trees)
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>								
1	0+250	District Primary Health Center	RHS	7	400	23	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
2	4+500	Panchayath Union Elementary School	LHS	10	51.6	33	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
3	7+800	Government Higher Secondary School	LHS	11	250	50	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
4	9+480	Panchayat Union Elementary School	LHS	12	75	142	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
5	12+000	Panchayath Union Middle School	RHS	9	83.9	30.5	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
6	12+500	Govt Primary Health Centre	LHS	200	150	43	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
7	13+850	Panchayat Union Elementary School	RHS	15	15	12	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
8	14+040	K S V Clinic	RHS	9.5			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
9	15+000	Govt. Higher Secondary School	LHS	9	224	158	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
10	16+600	KPM Matric school	LHS	7.5	94	155	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
11	17+750	Raasi Polytechnique College	LHS	15	17	23	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
12	26+300	Green Wolrd Excel School	LHS	12	206	99	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
13	28+000	Govt. High School	LHS	10			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>								
1	51+900	Panchayat LP School	LHS	5	12	9	Compound wall affected	New Compound Wall (Noise barrier) will be constructed

Sl. No.	Chainage (Km.)	Name of Sensitive receptor	Location (Left / Right)	Distance from Exist CL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
2	54+900	Govt. Higher Secondary School	RHS	5	193	181	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
3	55+600	Govt. Primary Health Center	RHS	10	32	98	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
4	55+900	Skanda School of Architecture	LHS	6			Compound wall affected	New Compound Wall (Noise barrier) will be constructed
5	60+100	Veterinary Hospital	RHS	153.5	5	6	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
6	61+350	Sri Vidyabharathi Education Institute	LHS	30			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
7	62+700	Govt.Higher Secondary School	RHS	9	163	198	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
8	63+400	Panchayat Library	LHS	9	15	23	No Direct Impact	Additional tree plantation will be provided
9	70+650	Panchayat Union Primary School	LHS	50	38	17	No Direct Impact	Additional tree plantation will be provided
10	71+150	Nursery School	LHS	9			Compound wall affected	New Compound Wall (Noise barrier) will be constructed
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>								
1	0+980	Malar Hospital	LHS	15			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
2	0+980	Ragevandra Physiotherapy Center	RHS	12			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
3	1+590	Government Girls' Higher Secondary School, Mohanur	RHS	16	120	200	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
4	1+800	Subramaniam Arts & Science College, Mohanur	LHS	15			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
5	2+800	Government Public Health Center	RHS	11			Compound wall affected	New Compound Wall (Noise barrier) will be constructed
6	5+200	Panchayth Union Elementary School, Thoppur	LHS	12	12	44	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)

Sl. No.	Chainage (Km.)	Name of Sensitive receptor	Location (Left / Right)	Distance from Exist CL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
7	7+350	Saranga Dental Clinic	RHS	18			No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
8	9+150	SRG Engineering College	LHS	20	300	130	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
9	10+020	Arumugham Udaiyar Govt Higher Secondary School, Aniyapuram	RHS	8	150	75	Compound wall affected	New Compound Wall (Noise barrier) will be constructed
10	11+550	Krishi Vigyan Kendra, Namakkal	LHS	15	103	167	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
11	11+800	Animal Feed Analytical & Quality Assurance Lab	LHS	15	190	96	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
12	12+000	National Agricultural Development Program (NADP)	LHS	15	104	75	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)
13	12+200	Tamil Nadu Veterinary & Animal Science University	LHS	15	567	621	No Direct Impact	Additional Noise barrier with Mast trees (Nettilingam trees)



**Drawing No. 8.6: Conceptual Drawing for Noise Barrier**

## 8.5.2. Noise Pollution – Mitigation

### Construction Phase

- Careful planning of machinery selection, operations and scheduling of operations can reduce noise levels.
- Construction contract should clearly specify the use of equipment emitting noise of not greater than 90 dB(A) for the eight hour operation shift.

- The citing of construction yards should be done leaving at least 100 m distance from any residential areas, which will allow noise to attenuate.
- The main noise producing sources such as the concrete mixers, generators, grader etc. should be provided with noise shields around them. The noise shields can be any physical barriers, which is effective in adequate attenuation of noise levels. A 3 m high enclosure made up of brick and mud with internal plastering of a non-reflecting surface will be very effective in this regard.
- For protection of construction workers, earplugs should be provided to those working very close to the noise generating machinery.
- To avoid significant impacts on human health, it is being recommended to avoid construction work at certain sections during night times and ensure that only minimum required machinery is deployed on the site. At construction sites within 150 m of human settlements, noisy construction should be stopped between 10:00 pm and 8:00 am
- Noise level monitoring should be conducted as per Environmental Monitoring Plan given in EMP.

#### Operation Phase

- The proposed avenue plantation and other noise mitigation measures are expected to minimize the impacts on the immediate influence area of the project road.
- Development of greenbelt comprising selected species of trees with high canopy along the project road for attenuation of noise.
- Noise monitoring should be conducted as per Environmental Monitoring Plan.

### **8.5.3. Noise Pollution Monitoring**

Apart from provision of the mitigation measures, their effectiveness and further improvement in designs to reduce the concentration of pollutants in the soil due to construction activity shall be monitored, as contamination of soil is directly linked with contamination of water. The monitoring plan shall be functional in construction as well as in operation stages. Noise monitoring should be conducted as per the environmental monitoring plan given in the EMP.

## **8.6. Flora and Fauna – Mitigation Measures**

The major impact in this project on flora involves the removal of trees to permit construction and to provide clear zone for safety of the road users. There is no recorded wild life habitat in near vicinity of the project corridor.

Trees located within the formation width need to be removed to prevent collision with the trees, in case of accident. Roadside trees with strong and rigid stems can pose safety hazards. Some trees obstruct clear sight distances. Others have a propensity to overturn when old and are potential safety hazards depending upon age and decay condition. All such trees that are safety hazards need to be cleared. Mitigation measures for impacts identified are presented below.

**Table 8.8. Impact on Flora and Fauna and Mitigation Measures**



Sr. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Forest area	No Direct Impact	No forest land to be diverted	Precautions to be taken during construction near forest areas such as avoiding blasting, locating construction camps away from forests, avoiding work during night time and providing training to workers. Proper signages and rumble strips will be provided to avoid the accidents.
2	Wild Life	No Impact	No wild life habitat	Nil
3	Trees Cutting	Direct impact	Increase in soil erosion, silting of water bodies, Dust & noise pollution.  loss of shade & loss of tree products	Maximum deviation in alignment design to save the road side trees. Compulsory tree plantation in the ratio of 1:10, i.e. for each tree cut, ten saplings will be planted. Avenue plantation along corridor. Small trees and endangered tree species will be transplanted.
4	Vegetation	Direct Impact	Increase in soil erosion, silting of water bodies, noise pollution. Dust Pollution	Clearing and grubbing will be minimized, and sprinkled with water to reduce dust pollution. Exposed surface like embankment slopes will be protected with stone pitching and turfing. Open land in and around plant will be vegetated.
5	Cattle Grazing	No Impact	No cattle grazing found	Nil

### 8.6.1. Impacts on Forest Area – Mitigation

#### Construction Phase

- Blasting and mechanical drilling of rocks should not be adopted for cutting of rock masses. Instead of blasting, rock cutting shall be adopted to avoid the nuisances to the wildlife present in the forest areas of the project road.
- Construction camp should not be set up near the forest areas. Only minimum required machinery shall be deployed on the site.
- Lighting for construction site at forest locations should be avoided during night time.
- Adequate awareness program should be provided to the construction workers on forest and environment.

### 8.6.2. Impacts on Wildlife – Mitigation

No wildlife habitat/wildlife crossing seen along the project corridor.

### 8.6.3. Tree Cutting – Mitigation

The mitigation and enhancement measures taken along the project corridors includes,

- Compensatory tree plantation at the ratio of 1:10
- Transplantation of small trees (<30 cm girth size)
- Plantation at Governemnt institutional premises

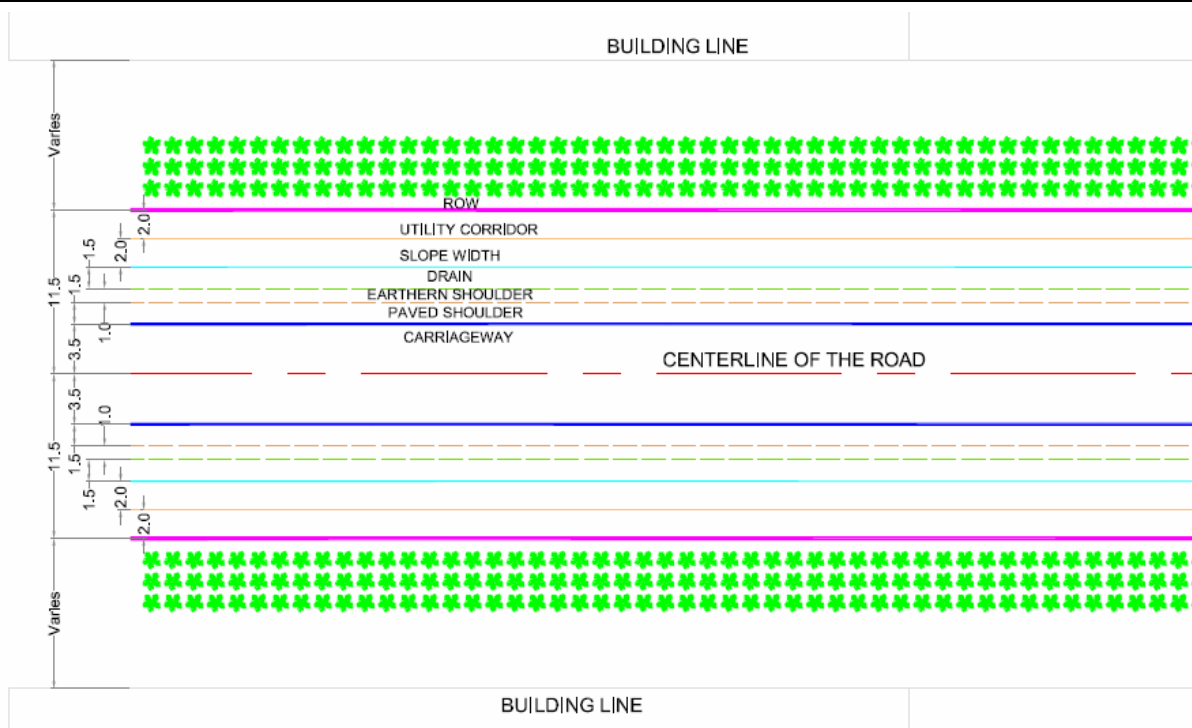
#### 8.6.3.1. Avenue Plantation

Avenue plantation shall be carried out as per IRC SP 21 – 2009 “Guidelines on Landscaping and Tree Plantation”. Trees shall be planted along the project corridors by TNRSP through Tamil Nadu Forest Department. Such plantations will be initiated once the construction is complete. The objective behind such plantation is to cover / re-vegetate the areas within the RoW that are presently barren. To maintain the present character of strip plantation, similar indigenous trees should be planted. Small trees (<30 cm) shall be transplanted wherever possible to minimize the impacts of loss of trees. List of indigenous tree species recommended in “Annex E (clause 11.11.1)” in IRC SP 21 -2009 for plantation for Tamil Nadu State is presented as **Table 8.9**.

**Table 8.9. List of Indigenous Trees Spices Suggested for Avenue Plantation**

Sl No.	Botanical Name	Common Name
1	<i>Albizzia procera</i>	Safed Siris
2	<i>Albizzia amara</i>	Cylone Siris
3	<i>Amheritia nobilis</i>	Tree of Heaven / Pride of Burma
4	<i>Bischofia javanica</i>	Paniala / Pankain
5	<i>Colvelia recemosa</i>	Kilbili
6	<i>Dalbergia latifolia</i>	Black shisham / Rosewood
7	<i>Delonix regia</i>	Gulmohar
8	<i>Mengifera indica</i>	Desi mango
9	<i>Michelia champaka</i>	Swarnachampa
10	<i>Peltophorum pherugenium</i>	Fellow Gulmohar
11	<i>Polyalthia longifolia</i>	Ashok
12	<i>Arecaceae</i>	Palm trees
13	<i>Saraca asoca</i>	Sita Ashok
14	<i>Santalum album</i>	White sandal
15	<i>Tamrindus Indica</i>	Imli

As per the Madras High Court order, 10 trees are to be planted for each tree to be cut. All plantation work shall take place at the onset of monsoon season. The plant should be provided with adequate protection from animals and proper monitoring should be carried out to ensure their growth and survival rate. Costing has been done as per forest schedule of rate, including the plantation and maintenance cost for 5 years. Summary of tree to be transplanted (less than 300 mm) is given in **Table 8.10**.



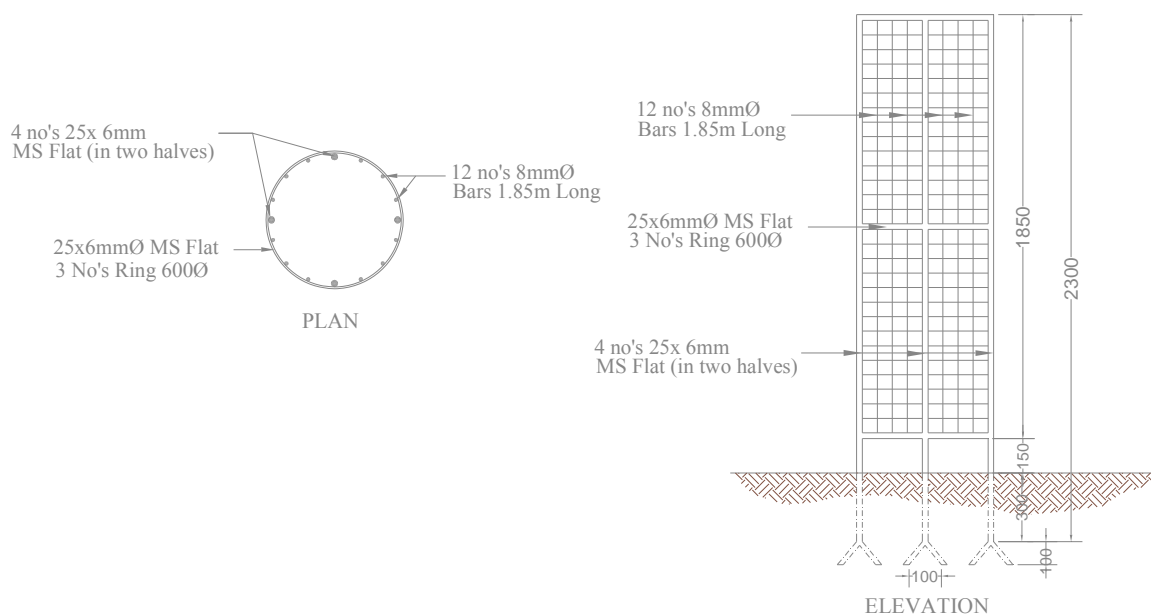
**Drawing No. 8.7: Conceptual Plan for Avenue Plantation**

**Table 8.10. Summary of Trees to be Transplanted**

Sl No	Name of the Corridor	No. of Trees to be transplanted						Grand Total
		With Manpower (<100mm)			Using Machinery (100-300mm)			
		LHS	RHS	Total	LHS	RHS	Total	
1	Tiruchengode to Paramathy Section of Road No. 2 (SH 86)	454	257	711	116	107	223	<b>934</b>
2	Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)	13	7	20	46	68	114	<b>134</b>
3	Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)	158	109	267	128	146	274	<b>541</b>
4	Mohanur to Namakkal Section of Road No. 5 (SH 95)	72	45	117	83	92	175	<b>292</b>

### 8.6.3.2. Plantation at Enhancement Sites

A number of Government Offices, schools, hospitals, and cultural properties exist along the project corridors. Tree such as *Polyalthia longifolia* (Mast tree) is proposed for planting sensitive receptor's premises, so that impact of noise pollution due to traffic can be reduced. Landscape design has been worked out to enhance the aesthetic beauty of selected cultural property premises. Drawings for Plantation at enhancement sites are shown in **Annexures 3.56 & 3.59** of EMP Report.



**Drawing No. 8.8: Conceptual Plan for Tree Guard**

#### 8.6.4. Impacts on Vegetation – Mitigation

High embankment will be re-vegetated with local shrubs and grasses to prevent soil erosion from the bare earth, prior to the monsoon.

#### 8.6.5. Cattle Grazing – Mitigation

No cattle grazing are seen along the corridor.

### 8.7. Socio-Economic Environment – Mitigation

Adverse socio-economic impacts include all disruptions on the social and economic interactions of communities due to the road project. This involves effect on both the adjacent communities (mostly direct) as well as the nearby communities (mostly indirect). The various impacts have been detailed as:

- General impacts that apply to the entire corridor,
- Specific impacts on likely properties and PAPs, within the Corridor of Impact (CoI) of the project corridor.

#### 8.7.1. General Impacts – Mitigation

General impacts to socio-economic environment due to project are summarized in **Table 8.11**.

**Table 8.11. General Impacts to Socio-Economic Environment**

Sl. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
1	Fear of uncertainties	Direct, long Impact	Land and property owners are subjected to sufferings	Public participation sessions were/will be conducted in

Sl. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
	regarding future		regarding uncertainties of the extent of loss and the nature of compensation	different stages of project.
2	Inducement of land prices	Direct impact	Danger of unscrupulous speculators moving in to purchase land	Market Value Assessment Committee will decide the actual cost of land
3	Inducement of squatter influx	Direct impact	Squatters may attempt to occupy adjacent land in the hope of receiving compensation Undue pressure on local resources	The dates of base-line socio-economic survey have been considered as cut-off date for identification of project affected people PAP.
4	Loss of utilities and amenities	Direct Impact	Natural (trees, bushes and grasslands), and Physical structures (public or private assets and utilities).	Relocation of utilities will be completed prior to start of project work. These have been further discussed in details in RAP
5a	Public Health and Safety	High direct adverse impact	Psychological impacts on their owners and others associated with them.  Debris generated	Advance notice as per RAP (4 months before commencement of work) will be given to the owners of the affected properties. Debris, so generated will be disposed to the satisfaction of Engineer. Refer <b>Annexure 3.5</b> of the EMP Report
5b	Labour Camps	Direct Impact	Can have clashes with the local population Pressure on basic facilities like medical services, power, water supply, etc. Transmission of communicable diseases including aids. Sanitary conditions in the labour camps	All contractors will be encouraged to recruit the local people as labourer at least for unskilled and semi-skilled jobs. Hygiene and basic facilities will be ensured at labour camp to prevent the spread of disease. Refer <b>Annexure 3.2</b> and <b>3.9</b> of the EMP Report
5c	Allied activities	Indirect Impact	Social and economic life of the local population due to quarrying and crushing operations, traffic diversions, etc. Traffic jams and congestion, loss of access and other road accident risks Temporary land acquisition	Detailed traffic control plans shall be prepared and submitted to the engineer for approval 5 days prior to commencement of work on any section of road.
5d	Accidents and Safety	Direct Impact	School children Local commuters	The contractor will provide, erect and maintain barricades, including signs marking flags lights and flagmen as required by the Engineer.

Sl. No.	Item	Impact	Impact (Reason)	Mitigation/Enhancement
6	Resettlement of People	In direct impact	Pressure on civil amenities, water sources, grazing lands, fuel wood, medical facilities etc.	A comprehensive resettlement action plan has been prepared to improve the standard of living of the affected population
7	Land Use Changes	Indirect impact	Succession of land uses and higher return uses would displace the lower return uses at major intersections and in settlement areas. Urban fringe areas will be subjected to ribbon development.	Project is widening of existing of pavement, hence no major change in land use pattern is envisaged along the project road.
8	Disturbance to road side services	Indirect Impact	Some Shops may be shifted, no income from highway users hence loss of service to the local people	The cleaning of such informal establishment will be carried out as phase-wise resettlement Programme
9	Removal of encroachments and squatters	Indirect impact	loss of shelter disturbance to family and community life	Impact will be avoided by implementation of phase-wise resettlement action programme. Notice will be served 4 months in advance.
10	Sensitive community facilities	Indirect impact	Loss of community facilities or institutions	Discussed in detail in following paragraphs.
11	Host Community	Indirect Impact	Displaced, resettled families will put pressure on the existing scarce infrastructure and amenities available with the host community	special provision has been made in the comprehensive resettlement action plan for the host community

### 8.7.1.1. Fear of Uncertainties Regarding Future

The Project is only of strengthening of the existing road, and within the confines of the existing RoW, the fear of uncertainties is most likely limited to the people squatting and encroaching in the RoW. At places where the community utilities are to be affected a certain amount of anxiety will be among the people in that particular community.

To remove such fear from the people, public participation sessions were/will be conducted in different stages of project, viz. pre-design, design, pre-construction and construction.

In the pre-design stage, a comprehensive socio-economic survey was conducted to prepare base line status of the households squatting or encroached upon the RoW. During the survey each households were contacted/interviewed and they were explained about the purpose of the survey, need of the project and benefits associated with the project etc.

The second stage of public participation was in the form of village meetings, focus group discussion, individual interviews, voluntary and academic institution consultation.

The third stage of participation session will start before pre-construction. The EMU will verify and consult the individual Eps with the help of an NGO for distribution of ID card. At this stage the Eps will be explained about their entitlement and R&R framework.

All people likely to be displaced will be informed in advance through NGO by a time bound programme about resettlement to remove fear of uncertainty.

During the construction stage the consultation process will continue to avoid any inconvenience to the community at any point of time.

#### **8.7.1.2. Inducement of Land Prices**

As the project becomes common knowledge, the land prices along the corridor will increase. For realignment and geometric improvement of highway, extra additional land may be required; Market Value Assessment Committee will decide the actual cost of such land. The actual cost of land may be different from induced land cost. The MVAC have time bound programme to calculate the actual cost of land. In calculating the actual land, cost individual project affected person (PAP) & NGOs will be involved.

#### **8.7.1.3. Inducement of Squatter Influx**

Once the project becomes common knowledge, people may attempt to occupy the land along the corridor in anticipation of compensation. To avoid such, the dates of base-line socio-economic survey have been considered as cutoff date for identification of project-affected people, who are eligible for compensation. The cut off dates will be used to establish whether a person located in the right way qualifies as a PAP for the disbursement of compensation. All the PAPs recorded during socio-economic baseline survey are eligible for compensation after verification by EMU.

#### **8.7.1.4. Loss of Utilities and Amenities**

The site clearance for construction of road may result in loss or relocation of certain utilities and amenities, viz. electricity, water and telephone line etc. People dependent upon these utilities and amenities may experience inconvenience and economic loss. However, such impacts are unavoidable, but every care will be taken in co-ordination with concerned departments, to restore the facility within shortest possible time to avoid any prolonged hardship or inconvenience to the community. Similarly, other utilities like water source, cattle trough etc. will be constructed or replaced at appropriate place with the consent of community prior to dismantling the existing one.

#### **8.7.1.5. Public Health and Safety**

- a) During the Pre-construction and Construction Phases dismantling of the structures for CoI clearance and road construction may result in health hazards. To minimize this potential negative impact the following recommendations should be adopted:
  - To avoid the psychological impacts due to the demolition of properties on the owners and other tenants. The advance notice as per RAP will be given to the owners of the affected properties. An advance notice will be served at least four months before construction commences. For squatters needing relocation, all R&R activities will be undertaken and entitlements will be completed before construction starts.

- Debris generated from the demolition of properties will be properly disposed of to avoid the health problems in the safeties. Earth material, if required will be dumped in borrow areas as approved by the engineer. Borrow areas will be filled to avoid health hazards from stagnant water collecting in these areas. The contractor will make all arrangements for dismantling and cleaning up of debris. Implementation will be as per the approval and direction of the engineer.

b) During the construction period the potential negative community impacts arising from imported labour in the labour camps will be avoided as per following:-

All contractors will be encouraged to recruit the local people as labours at least for unskilled and semi-skilled jobs. This would automatically reduce the magnitude of impact expected due to outside labour. Wherever the local labours are not available, the contractor should ensure the following provision for imported labour.

- The additional stress on the facilities like medical services, power, water supply due to a labour camp in a local area will be avoided by the contractor providing these facilities for the labours as per the direction of the Engineer
- In areas where wildlife resources are abundant, construction workers shall be instructed how to protect natural resources, fauna, flora and aquatic life. In such areas hunting and unauthorized fishing are prohibited.
- In the labour camps, all temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp will be properly designed built and operated so that no health hazard occurs. Garbage bins will be provided in the camp and regularly emptied. The collected garbage will be disposed-off in a hygienic and approved manner.

c) Allied activities during construction period may cause local disruption:

In the construction phase, there may be inconvenience to the local people as well as the highway passengers due to traffic jams and congestion, loss of access and other road accident risk as a result of construction. Detailed traffic control plans shall be prepared and submitted to the engineer for approval 5 days prior to commencement of work on any section of road. In the preparation of the traffic control plan special consideration shall be given to the safety of pedestrians and workers at night.

d) Accidents and Safety

To avoid the accidents during construction phase, contractor shall take all necessary measures to ensure traffic safety. The contractor will provide, erect and maintain barricades, including signs marking flags lights and flagmen as required by the Engineer.

In the operation phase, traffic control measures such as speed breakers and sign boards (including speed limits) will be provided and strictly enforced in residential areas, near schools and water bodies like ponds and wells.

#### **8.7.1.6. Resettlement of People**

People displaced from their home and livelihood on account of the proposed activity will be taken care in the project. A comprehensive resettlement action plan has been prepared to improve the



standard of living of the affected population if not at least restore their livelihood and regaining their former standard of living (Refer Resettlement Action Plan Report).

#### **8.7.1.7. Land Use Changes**

As regards land use changes, it is likely that the impact would be very minimal. Since the project is widening of road within the existing ROW, the possibility of major land acquisition is not envisaged. In design stage, utmost care has been taken to keep the land acquisition at minimal for road realignment and geometric purpose. The probable impact on roadside business and trees within RoW has been reduced and avoided through design.

#### **8.7.1.8. Disturbance to Roadside Service**

Along the highway, near settlements, small shops serve the local people as well as highway users. Some of these shops are within the RoW. To avoid any impact on livelihood of people dependent on roadside business, the cleaning of such informal establishment will be carried out as phase-wise resettlement programme. Loss of livelihood of the displaced shop owners will be compensated as per assistance or entitlements in Entitlement Framework of Tamil Nadu.

#### **8.7.1.9. Removal of Encroachments and Squatters**

The impact due to removal of encroachments and squatters will be avoided by implementation of phase-wise resettlement action programme. To avoid the severance of impact, advance notice will be given to the encroachers and squatters. The notice will be given four months prior to construction phase starts. Relocation of all such impacted persons will be as per R&R schedule.

#### **8.7.1.10. Sensitive Community Facilities**

The impacts due to project on the sensitive community facilities such as health facilities, a number of recreational facilities and others like ponds and cultural community assets and educations institutions are avoided in the design phase of the project. These are discussed in detail in **Section 8.7.2.1**.

#### **8.7.1.11. Host Community**

Families displaced due to the project will be resettled at suitable place. This may put pressure on the existing scarce infrastructure and amenities available with the host community. To avoid such pressure on already scarce resources, viz. water, grazing land, fuel woods, and medical facility etc. Special provision has been made in the comprehensive resettlement action plan for the host community. This will be applicable where the total number of resettled people exceeds 200 or 10 percent of the host community whichever is less (Refer: Resettlement Action Plan Report).

## 8.7.2. Specific Impacts – Mitigation

### 8.7.2.1. Sensitive Community Structures

A number of sensitive community assets exist within the Project Influence Area. **Table 8.12** presents the impacts and mitigation / enhancement proposed at each location.

**Table 8.12. List of Sensitive Community Structures and Mitigation / Enhancement Measures for them**

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>								
1	57+800	Chruch	RHS	60			No Direct Impact	Cultural enhancement measures ie., Tree plantation and Sitting benches
2	58+100	Graveyard	LHS	8	100	1	No Direct Impact	No Space to carry out enhancement measure
3	58+180	Eswaran Temple	RHS	7			Direct Impact	Compound Wall will be reconstructed in consultation with concerned authority. Tree Plantation and landscaping are proposed as enhancement measures
4	58+220	Muniyappan Shrine	RHS	4			Direct Impact	Compound Wall will be reconstructed in consultation with concerned authority. Tree Plantation and landscaping are proposed as enhancement measures
5	59+500	Athanur Amman kovil	LHS	9			No Direct Impact	No Space to carry out enhancement measure
6	59+900	Shirukalimathar Temple	RHS	7			Direct Impact	New CW shall be Constructed in consultation with concerned authority
7	60+000	Mahamuniyappan Kovil	RHS	10			Direct Impact	Assistance for relocation affected features shall be given
8	60+200	Graveyard					No Direct Impact	No Space to carry out enhancement measure
9	60+360	Mariamman Kovil	RHS	11			No Direct Impact	No Space to carry out enhancement measure
10	60+380	Bhagavathi Amman	RHS	11			No Direct Impact	No Space to carry out enhancement measure

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
		Kovil						
11	64+000	Graveyard	LHS	10			No Direct Impact	No Space to carry out enhancement measure
12	64+800	Saptha Kaniyar Temple	RHS	14			No Direct Impact	No Space to carry out enhancement measure
13	64+800	Mosque	RHS	8.5			No Direct Impact	No Space to carry out enhancement measure
14	64+800	Vinayaka Temple	RHS	11			No Direct Impact	No Space to carry out enhancement measure
15	66+460	Dharga	LHS	12			No Direct Impact	No Space to carry out enhancement measure
16	66+200	Mariyamman kovil	LHS	12			No Direct Impact	No Space to carry out enhancement measure
17	66+660	Ganapathy Shrine	RHS	6	10	20	Direct Impact	No Space to carry out enhancement measure
18	67+250	Mariyamman Kovil	LHS	5			Direct Impact	New CW shall be Constructed in consultation with concerned authority
19	67+300	Vinayaka Shrine	LHS	9	10	10	Direct Impact	Assistance for relocation shall be given
20	67+740	Ayyankar Shrine	LHS	13			No Direct Impact	No Space to carry out enhancement measure
21	67+800	Karuppanar	RHS	14			No Direct Impact	No Space to carry out enhancement measure
22	68+400	Temple	LHS	12			No Direct Impact	Cultural enhancement measures ie., Tree Plantation and landscaping are proposed as enhancement measures
23	69+200	Burial Ground	RHS	12			No Direct Impact	No Space to carry out enhancement measure
24	69+400	Mariamman Kovil	RHS	15			No Direct Impact	No Space to carry out enhancement measure
25	70+200	Ganapathy Shrine	RHS	10			No Direct Impact	No Space to carry out enhancement measure
26	71+800	Ganapathy Temple	RHS	9			Direct Impact	Assistance for relocation shall be given
27	73+050	Shrine	RHS	14			No Direct Impact	No Space to carry out enhancement measure
28	74+000	Muniyappa Temple	RHS	13			No Direct Impact	Cultural enhancement measures ie., Tree plantation and Sitting benches
29	76+400	Temple	LHS	15			No Direct Impact	Cultural enhancement measures ie., Tree Plantation and landscaping are proposed as

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
								enhancement measures
30	76+600	Shrine	RHS	10			Direct Impact	Assistance for relocation shall be given
31	76+550	Vinayaka Temple	LHS	15			No Direct Impact	No Space to carry out enhancement measure
32	76+900	Burial Ground	RHS	11			No Direct Impact	No Space to carry out enhancement measure
33	79+360	Muniyappan Temple	LHS	12			No Direct Impact	No Space to carry out enhancement measure
34	79+700	Bhagavathi Amman Kovil	RHS	11			No Direct Impact	No Space to carry out enhancement measure
35	80+000	Siva Temple	LHS	12			No Direct Impact	Cultural enhancement measures ie., Tree plantation and Sitting benches
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>								
1	0+500	Naga Shrine	RHS	7			Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, White wash for CW
2	0+500	Sannasi Varadhan Kovil	RHS	16			No Direct Impact	No Space to carry out enhancement measure
3	1+750	Veerabadra Kovil	RHS	13	5	7	No Direct Impact	No Space to carry out enhancement measure
4	1+980	Ganapati Shrine + Navagraha	LHS	6.5	2.5	2.5	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
5	2+000	Tree Shrine	LHS	7.5	3	3	Direct Impact	Assistance will be given for relocation
6	2+400	Tree Shrine	LHS	8	4	3	Direct Impact	Assistance will be given for relocation
7	4+000	Tree Shrine	RHS	15			No Direct Impact	No Space to carry out enhancement measure
8	4+400	Abandoned	RHS	11.3			No Direct Impact	No Space to carry out enhancement measure
9	4+700	Ganapati Shrine	LHS	7	1	1	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
10	5+400	Sri Selva Ganapathi Sri Mattu Mariyamman Kovil	LHS	14	35	22	No Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
11	6+150	Grave yard	LHS	13			No Direct Impact	No Space to carry out enhancement measure
12	6+600	Ganapati Shrine	LHS	9			No Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
13	7+100	Naga shrine	LHS	5			Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
14	8+660	Temple	RHS	6			Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
15	8+650	Tree Shrine	RHS	5			Direct Impact	Assistance will be given for relocation
16	9+360	Temple	LHS	7	3	4.5	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
17	11+000	Shrine	RHS	11			No Direct Impact	No Space to carry out enhancement measure
18	11+700	Temple	RHS	10.5			No Direct Impact	Tree Plantation, Landscaping
19	12+220	Mariamman Kovil	LHS	6	5	3	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
20	12+300	Mariamman Kovil	RHS	9	7	4	No Direct Impact	No Space to carry out enhancement measure
21	13+300	Grave yard	RHS	5			Direct Impact	No Space to carry out enhancement measure
22	13+600	Thooya Mangala Matha Alayam	LHS	12			No Direct Impact	No Space to carry out enhancement measure
23	14+100	Mariyamman Kovil	LHS	7.5			No Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
24	14+300	Hanuman	RHS	8.5	2	2	No Direct Impact	No Space to carry out enhancement measure
25	16+455	Samadhi	RHS	12	2	2	No Direct Impact	No Space to carry out enhancement measure

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
26	14+950	Bhagavathi Amman	RHS	6.5	3	3	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
27	15+200	ECI Church	LHS	23	22	8	No Direct Impact	Nettilingam trees with Iron Tree Fence are provided.
28	15+700	Grave yard	LHS	11			No Direct Impact	Tree Plantation
29	18+150	Ganapathi Temple	RHS	13			No Direct Impact	No Space to carry out enhancement measure
30	18+300	Grave yard	LHS	11			No Direct Impact	No Space to carry out enhancement measure
31	20+600	Temple	RHS	13			No Direct Impact	No Space to carry out enhancement measure
32	23+000	Anjaneya Temple	RHS	5			No Direct Impact	No Space to carry out enhancement measure
33	24+800	Alleri Muniyappan Kovil	LHS	8			No Direct Impact	No Space to carry out enhancement measure
34	17+600	Shrine	RHS	5.5			Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
35	28+020	Ganapathi Shrine	LHS	5.5	4	5	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
36	28+500	Grave yard	LHS	10			No Direct Impact	
37	28+800	Shrine	RHS	7	7	6	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
38	29+200	Mariamman Kovil	LHS	9			No Direct Impact	No Space to carry out enhancement measure
39	29+850	Ganapathi Shrine	LHS	9	7	3	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>								
1	53+950	Church at	LHS	8	100	30	Direct Impact	Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
								wash for CW
2	54+550	Tree Shrine	LHS	8			No Direct Impact	No Space to carry out enhancement measure
3	54+755	Vinayaka shrine	RHS	4.5	3	3	Direct Impact	Tree Plantation, Landscaping,
4	55+300	Grave Yard with shrine	LHS	7	80	40	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
5	55+500	Vinayaka Temple	LHS	7	5	5	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
6	59+320	Tree Shrine	LHS	8	2	2	No Direct Impact	No Space to carry out enhancement measure
7	61+050	Shiva Temple	LHS	10	6	4	No Direct Impact	Tree Plantation, Landscaping
8	61+300	Mariamman Kovil	LHS	10	15	10	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
9	62+200	karuppanar Kovil	LHS	9	2	2	No Direct Impact	No Space to carry out enhancement measure
10	63+100	Grave yard	RHS	9	25	15	No Direct Impact	Nettilingam trees with Iron Tree Fence are provided.
11	63+100	Grave yard	LHS	10	30	15	No Direct Impact	Nettilingam trees with Iron Tree Fence are provided.
12	63+900	Soudeswary amman kovil	LHS	7	10	6	No Direct Impact	No Space to carry out enhancement measure
13	64+200	Vinayaka Temple	RHS	10	6	6	No Direct Impact	No Space to carry out enhancement measure
14	67+500	Vinayaka shrine	LHS	8	5	5	Direct Impact	New Compound wall & Cultural enhancement measures ie., Tree Plantation, Landscaping, Benching & White wash for CW
15	71+120	St.Antoniya's Church	LHS	35	10	10	No Direct Impact	Tree Plantation with Iron Tree Fence
16	71+180	St.Mary's church	LHS	12	40	15	No Direct Impact	Tree Plantation with Iron Tree Fence

Sl. No	Chainage (Km.)	Name of Common Property	Location (Left / Right)	Distance from ECL (m)	Dimensions		Impact	Mitigation/Enhancement
					Length	Breadth		
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>								
1	1+220	Kuruvukkara Swami Kovil	LHS	25	8	10	No Direct Impact	
2	1+320	Shiva Temple	LHS	10	8	11	No Direct Impact	
3	1+550	Ganapathi Shrine	LHS	14	1.5	4	No Direct Impact	
4	1+610	Perumal Kovil	LHS	15	5	10	No Direct Impact	
5	2+900	Karuppu Swami Kovil	LHS	15	10	10	No Direct Impact	
6	6+900	GanapathiKovil	RHS	20	3	8	No Direct Impact	Tree Plantation, Providing Sitting Benches, Construction of Compound Wall are proposed as enhancement measures.
7	7+350	MariammanKovil	RHS	15	6	10	No Direct Impact	Tree Plantation, Providing Sitting Benches, Construction of Compound Wall are proposed as enhancement measures.
8	8+420	GanapathiKovil	LHS	12	4	6	No Direct Impact	Tree Plantation, Providing Sitting Benches, Construction of Compound Wall are proposed as enhancement measures.
9	10+800	Aniyapuram Mariyamman kovil	LHS	50	50	100	No Direct Impact	
10	12+700	MadhuraiveeranKovil	LHS	15	20	10	No Direct Impact	Tree Plantation, Benches, Construction of Compound Wall are proposed as enhancement measures
11	13+000	Graveyard	RHS	15	10	10	No Direct Impact	
12	13+050	Amman Kovil	LHS	15	10	15	No Direct Impact	
13	13+300	KaliammanKovil	RHS	16	10	15	No Direct Impact	



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Besides mitigation & enhancement, following measures will be taken for safety of the locals:

- Local people will be informed about the schedule of construction activity, so that the local people remain prepared in advance.
- The existing sign boards will not be removed but shifted to appropriate place during construction, so that people don't find problem in identifying the tourist/religious place.
- During construction proper demarcation and sign board, indicators and flag man will be deputed for safe traffic movement.

## **8.8. Bus Shelter, Bus Bays, Truck Lay Bys, Resting Place and Service Road**

As a part of road improvement, bus shelters will be constructed/repared at all built-up locations. Proposal for bus shelter, bus bays are summarized in **Section 2.8.5**. All the existing bus shelters will be either reconstructed/relocated or repaired or rehabilitated. The list of existing bus bays and busstops are presented in **Table 8.12**.

**Table 8.13. List of Existing Bus Shelters and Mitigation / Enhancement Measures for them**

Sl. No.	Chainage (Km.)	Location (Left / Right)	Distance from ECL (in mts)	Dimensions		Impact	Mitigation/Enhancement
				Length	Breadth		
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>							
1	57+400	LHS	13	4	2	Direct Impact	Reconstructed at suitable location as per drawing
2	57+400	RHS	14	4	2	Direct Impact	Reconstructed at suitable location as per drawing
3	57+700	RHS		4	2	Direct Impact	Reconstructed at suitable location as per drawing
4	58+000	RHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
5	59+500	LHS	2	50	60	Direct Impact	Reconstructed at suitable location as per drawing
6	59+840	RHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
7	60+800	RHS	9	4	2	Direct Impact	Reconstructed at suitable location as per drawing
8	62+250	LHS	12	4	2	Direct Impact	Reconstructed at suitable location as per drawing
9	62+430	LHS		4	2	Not Affected	
10	63+550	LHS		4	2	Direct Impact	Reconstructed at suitable location as per drawing
11	63+550	RHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
12	64+330	RHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
13	65+300	RHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
14	65+790	RHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
15	66+670	LHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
16	67+300	LHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
17	68+100	RHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
18	69+390	LHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
19	70+230	LHS		4	2	Not Affected	
20	71+700	LHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
21	73+800	LHS	8	4	2	Direct Impact	Reconstructed at suitable location as per drawing
22	74+300	RHS		4	2	Not Affected	
23	76+550	LHS	9	4	2	Direct Impact	Reconstructed at suitable location as per drawing
24	79+200	RHS	9	4	2	Direct Impact	Reconstructed at suitable location as per drawing
25	80+900	LHS		80	5	Direct Impact	Reconstructed at suitable location as per drawing
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>							
1	0+300	LHS	6	4	3	Direct Impact	Reconstructed at suitable location as per drawing
2	2+620	LHS	6	4	3	Direct Impact	Reconstructed at suitable location as per drawing

Sl. No.	Chainage (Km.)	Location (Left / Right)	Distance from ECL (in mts)	Dimensions		Impact	Mitigation/Enhancement
				Length	Breadth		
3	2+620	RHS	8	4	3	Direct Impact	Reconstructed at suitable location as per drawing
4	3+500	RHS	7	4	3	Direct Impact	Reconstructed at suitable location as per drawing
5	4+150	LHS	5	4.5	4	Direct Impact	Reconstructed at suitable location as per drawing
6	4+500	LHS	9	4	4	No Direct Impact	
7	6+550	RHS		3	4	Direct Impact	Reconstructed at suitable location as per drawing
8	7+780	LHS	5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
9	10+200	LHS	5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
10	10+950	RHS	8	4	4	No Direct Impact	
11	12+210	LHS	4.5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
12	12+500	LHS	6	4	4	Direct Impact	Reconstructed at suitable location as per drawing
13	13+400	RHS	7	4	4	Direct Impact	Reconstructed at suitable location as per drawing
14	13+850	LHS	7.5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
15	14+400	LHS	7	4	4	Direct Impact	Reconstructed at suitable location as per drawing
16	14+950	RHS	6	4	4	Direct Impact	Reconstructed at suitable location as per drawing
17	16+460	LHS	5.5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
18	17+970	LHS	7	4	2	Direct Impact	Reconstructed at suitable location as per drawing
19	17+980	RHS	7	4	4	Direct Impact	Reconstructed at suitable location as per drawing
20	20+200	LHS	10.5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
21	20+620	LHS	5.5	3	2	Direct Impact	Reconstructed at suitable location as per drawing
22	23+000	RHS	6	4	4	No Direct Impact	
23	23+020	LHS	6	4	4	Direct Impact	Reconstructed at suitable location as per drawing
24	24+250	LHS	7.5	4	4	Direct Impact	Reconstructed at suitable location as per drawing
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>							
1	51+930	RHS	7	4	2	Direct impact	Reconstructed at suitable location as per drawing
2	53+700	RHS	4.5	3	3	Direct impact	Reconstructed at suitable location as per drawing
3	55+300	RHS	8	15	20	Direct impact	Reconstructed at suitable location as per drawing
4	57+620	LHS	7	2	1.5	Direct impact	Reconstructed at suitable location as per drawing
5	58+385	RHS	7	4	1	Direct impact	Reconstructed at suitable location as per drawing
6	60+300	RHS	4.5	2	1	Direct impact	Reconstructed at suitable location as per drawing

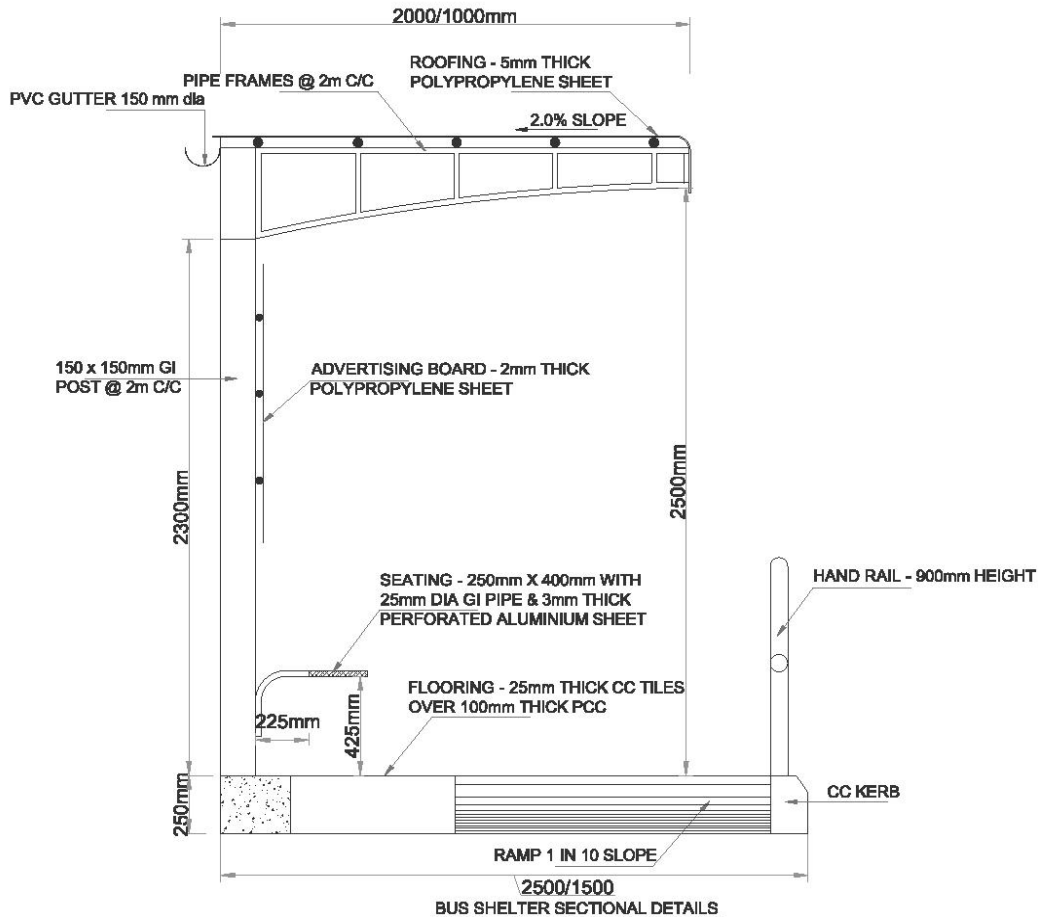
Sl. No.	Chainage (Km.)	Location (Left / Right)	Distance from ECL (in mts)	Dimensions		Impact	Mitigation/Enhancement
				Length	Breadth		
7	61+350	LHS	9	3	2	Direct impact	Reconstructed at suitable location as per drawing
8	62+700	RHS	5	4	2	Direct impact	Reconstructed at suitable location as per drawing
9	64+090	RHS	7	4	1	Direct impact	Reconstructed at suitable location as per drawing
10	67+500	LHS	4.5	2	2	Direct impact	Reconstructed at suitable location as per drawing
11	69+790	LHS	5	3	2	Direct impact	Reconstructed at suitable location as per drawing
12	70+130	LHS	7	3	2	Direct impact	Reconstructed at suitable location as per drawing
13	70+600	RHS	5	3	2	Direct impact	Reconstructed at suitable location as per drawing
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>							
1	1+370	LHS	6	5	2	Direct Impact	Reconstructed at suitable location as per drawing
2	2+900	LHS	4	4	1.5	Direct Impact	Reconstructed at suitable location as per drawing
3	5+150	RHS	5.5	3	2	Direct Impact	Reconstructed at suitable location as per drawing
4	6+395	RHS	5.5	2.5	2.5	Direct Impact	Reconstructed at suitable location as per drawing
5	6+405	LHS	6	3	2	Direct Impact	Reconstructed at suitable location as per drawing
6	6+900	RHS	5	1.5	0.3	Direct Impact	Reconstructed at suitable location as per drawing
7	8+030	LHS	4	3	2	Direct Impact	Reconstructed at suitable location as per drawing
8	9+970	RHS	8	3	2	No Direct Impact	
9	11+500	RHS	7	3	2	Direct Impact	Reconstructed at suitable location as per drawing
10	11+600	LHS	6	3	2	Direct Impact	Reconstructed at suitable location as per drawing
11	12+170	RHS	7.5	5	2	Direct Impact	Reconstructed at suitable location as per drawing
12	12+260	LHS	5	5	2	Direct Impact	Reconstructed at suitable location as per drawing
13	12+700	LHS	4.5	3	2	Direct Impact	Reconstructed at suitable location as per drawing
14	13+320	LHS	5	4	2	Direct Impact	Reconstructed at suitable location as per drawing

Besides the reconstruction/relocation of bus shelters and repair & rehabilitation of all existing bus shelters will be taken up, **Table 8.14** lists out numbers and locations of new bus shelter/bus bays that are proposed to be constructed.

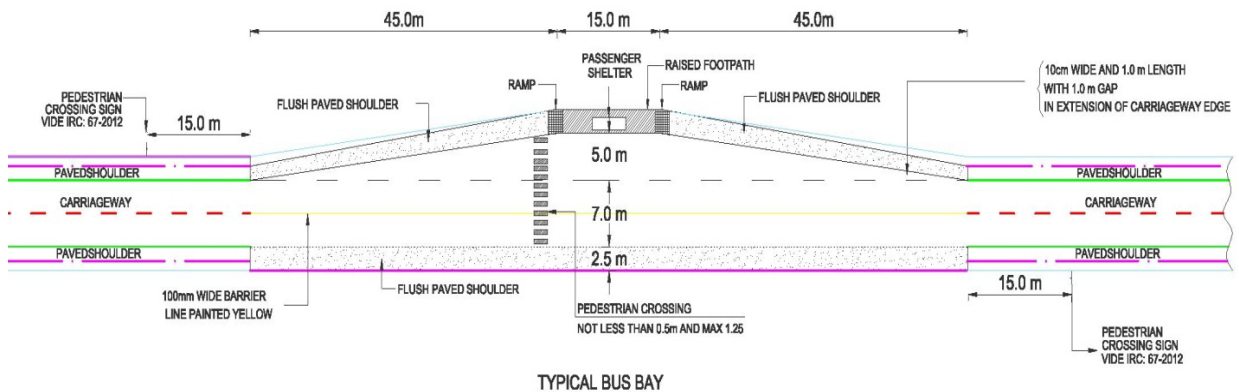
**Table 8.14. List of Proposed Bus Shelters**

Sl.No	Description	Location		Remarks
		LHS	RHS	
<b>Tiruchengode to Paramathy Section of Road No. 2 (SH 86)</b>				
1	Bus Stop/Bus Bay	57+450	57+240	
2	Bus Stop/Bus Bay	58+140	58+280	
3	Bus Stop/Bus Bay	59+870	59+720	
4	Bus Stop/Bus Bay	60+780	60+570	
5	Bus Stop/Bus Bay	63+630	63+730	
6	Bus Stop/Bus Bay	64+360	64+180	
7	Bus Stop/Bus Bay	65+470	65+680	
8	Bus Stop/Bus Bay	66+400	66+270	
9	Bus Stop/Bus Bay	67+380	67+500	
10	Bus Stop/Bus Bay	67+820	68+000	
11	Bus Stop/Bus Bay	69+430	69+550	
12	Bus Stop/Bus Bay	70+500	70+340	
13	Bus Stop/Bus Bay	71+870	71+620	
14	Bus Stop/Bus Bay	73+090	73+220	
15	Bus Stop/Bus Bay	74+200	74+460	
16	Bus Stop/Bus Bay	76+570	76+250	
17	Bus Stop/Bus Bay	79+160	79+040	
<b>Malliyakarai to Rasipuram Section of Road No. 4. (SH 79)</b>				
1	Bus Stop/Bus Bay	0+308	0+200	
2	Bus Stop/Bus Bay	2+550	2+655	
3	Bus Stop/Bus Bay	4+050	4+850	
4	Bus Stop/Bus Bay	6+200	6+600	
5	Bus Stop/Bus Bay	7+700	7+900	
6	Bus Stop/Bus Bay	9+500	9+700	
7	Bus Stop/Bus Bay	10+300	10+500	
8	Bus Stop/Bus Bay	12+550	12+450	
9	Bus Stop/Bus Bay	13+400	13+800	
10	Bus Stop/Bus Bay	14+350	14+900	
11	Bus Stop/Bus Bay	16+450	16+030	
12	Bus Stop/Bus Bay	18+000	17+850	
13	Bus Stop/Bus Bay	20+300	20+300	
14	Bus Stop/Bus Bay	21+760	21+500	
15	Bus Stop/Bus Bay	23+050	23+000	
16	Bus Stop/Bus Bay	24+200	24+200	
17	Bus Stop/Bus Bay	26+650	26+500	
18	Bus Stop/Bus Bay	28+600	28+700	

Sl.No	Description	Location		Remarks
		LHS	RHS	
19	Bus Stop/Bus Bay	29+350	29+050	
<b>Rasipuram to Tiruchengode Section of Road No. 4. (SH 79)</b>				
1	Bus Stop/Bus Bay	51+750	51+800	
2	Bus Stop/Bus Bay	53+900	53+850	
3	Bus Stop/Bus Bay	54+600	54+630	
4	Bus Stop/Bus Bay	55+500	55+550	
5	Bus Stop/Bus Bay	57+700	57+650	
6	Bus Stop/Bus Bay	58+450	58+650	
7	Bus Stop/Bus Bay	60+350	60+200	
8	Bus Stop/Bus Bay	61+400	61+300	
9	Bus Stop/Bus Bay	62+350	62+250	
10	Bus Stop/Bus Bay	63+700	63+800	
11	Bus Stop/Bus Bay	66+400	66+350	
12	Bus Stop/Bus Bay	67+450	67+350	
13	Bus Stop/Bus Bay	69+600	69+640	
14	Bus Stop/Bus Bay	70+550	70+500	
<b>Mohanur to Namakkal Section of Road No.5 (SH 95)</b>				
1	Bus Stop/Bus Bay	1+210	1+340	Mohanur Rly Stn
2	Bus Stop/Bus Bay	1+900	1+900	Mohanur/Rasipalyam
3	Bus Stop/Bus Bay	3+000	2+800	Maniyangalipatty /Rasipalyam/Pottampalayam
4	Bus Stop/Bus Bay	5+070	5+050	Thoppur
5	Bus Stop/Bus Bay	6+250	6+350	Naikarampatti
6	Bus Stop/Bus Bay	8+170	8+170	Moongilpatti
7	Bus Stop/Bus Bay	9+220	9+120	SRG Eng College
8	Bus Stop/Bus Bay	10+130	10+030	Aniyapuram
9	Bus Stop/Bus Bay	11+640	11+640	Melechavari
10	Bus Stop/Bus Bay	12+300	12+200	Nallayamgoundam pudur/Ladduvadi
11	Bus Stop/Bus Bay	12+725	12+830	Ladduvadi



**Drawing No. 8.9A: Conceptual Plan for Bus shelter**



**Drawing No. 8.9B: Conceptual Plan for Bus Laybye**

## 8.9. Truck Lay bye, Resting Place and Service Road

No truck lay bye, resting places and service roads are proposed as part of the subject project.

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## **8.10. Avoidance of Disruption and Safety Risks during the Construction Stage**

### **8.10.1. Disruption to the Community**

#### **8.10.1.1. Loss of Access**

At all times, the Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from side roads and property accesses connecting the project road. Work that affects the use of side roads and existing accesses will not be undertaken without providing adequate provisions.

The works will not interfere unnecessarily or improperly with the convenience of public or the access to, use and occupation of public or private roads, railways and any other access footpaths to or of properties whether public or private.

#### **8.10.1.2. Traffic Jams, Congestion and Safety**

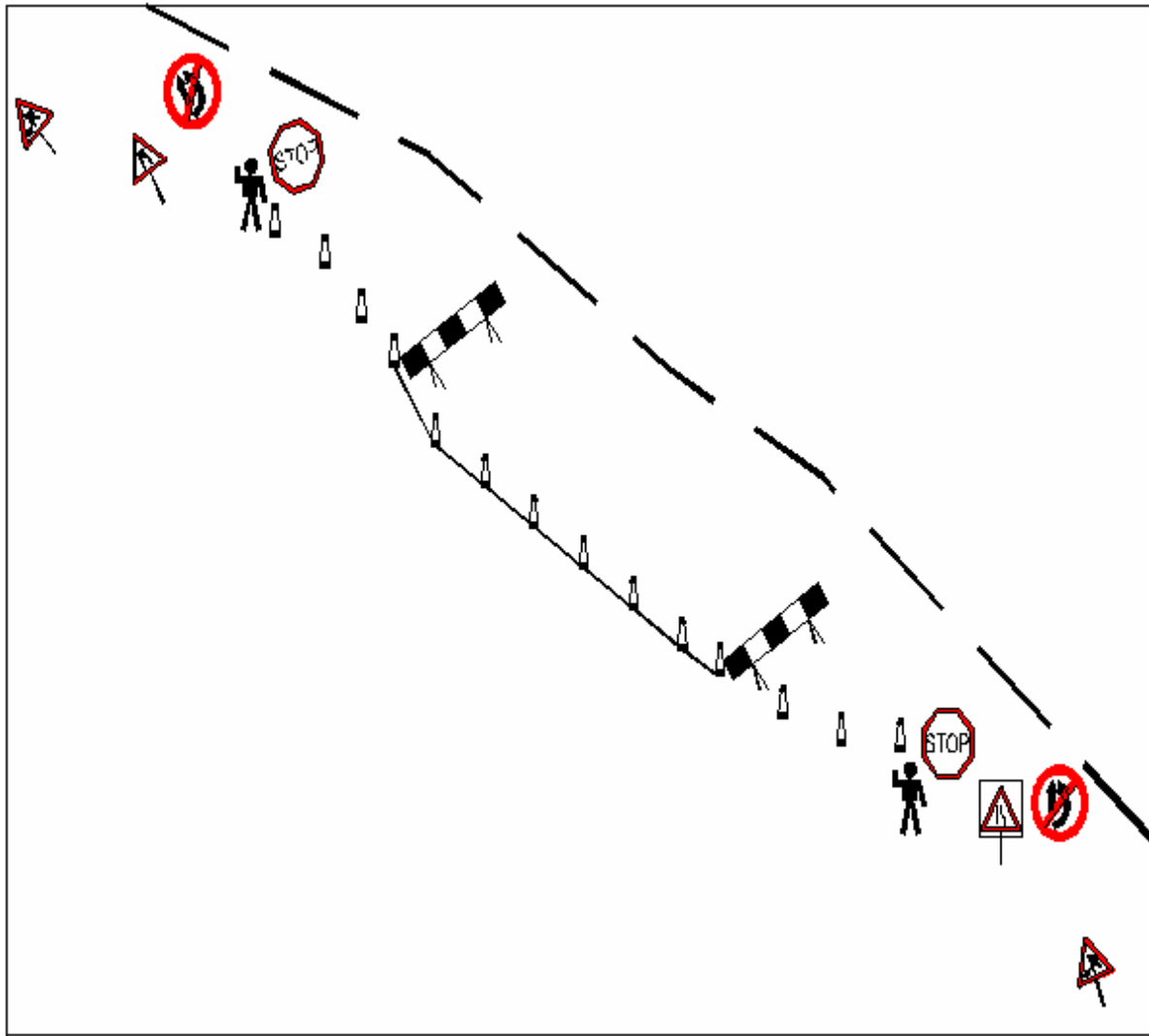
Detailed Traffic Control Plans will be prepared prior to commencement of works on any section of road. The traffic control plans will contain details of temporary diversions, details of arrangements for construction under traffic and details of traffic arrangement after cessation of work each day.

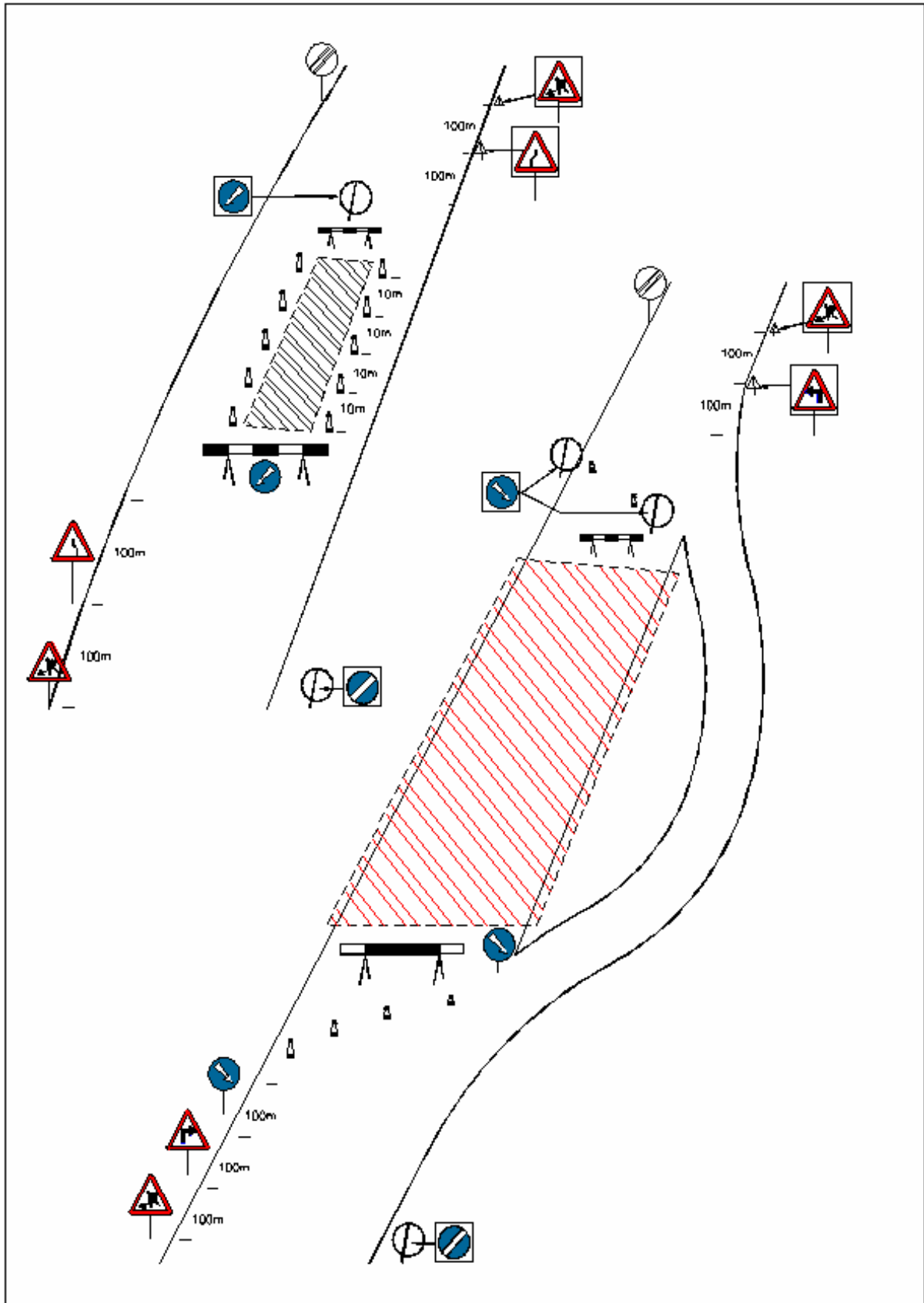
Temporary diversion (including scheme of temporary and acquisition) will be constructed with the approval of the Engineer and the EMU. Special consideration will be given in the preparation of the traffic control plan to the safety of pedestrians and workers at night.

The Contractor will ensure that the running surface is always properly maintained, particularly during the monsoon so that no disruption to the traffic flow occurs. The temporary traffic detours will be kept free of dust by frequent application of water, if necessary.

The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highway under improvement.







**Drawing No. 8.10: Conceptual Plan for traffic Diversion**

## **8.10.2. Safety of the Workers**

### **8.10.2.1. Risk from Operations**

The Contractor is required to comply with all the precautions as required for the safety of the workmen as per the International Labour Organisation (ILO) Convention No. 62 as far as those are applicable to this contract. The contractor will supply all necessary safety appliances such as safety goggles, helmets, masks, etc., to the workers and staff. The contractor has to comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.

### **8.10.2.2. Risk from Electrical Equipment**

Adequate precautions will be taken to prevent danger from electrical equipment. No material or any of the sites will be so stacked or placed as to cause danger or inconvenience to any person or the public. All necessary fencing and lights will be provided to protect the public. 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 provisions and to the satisfaction of the Engineer.

### **8.10.2.3. Risk at Hazardous Activity**

All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., will be provided with protective footwear and protective goggles. Workers, who are engaged in welding works would be provided with welder's protective eye-shields. Stone-breakers will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals.

The use of any herbicide or other toxic chemical will be strictly in accordance with the manufacturer's instructions. The Engineer will be given at least 6 working days' notice of the proposed use of any herbicide or toxic chemical. A register of all herbicides and other toxic chemicals delivered to the site will be kept and maintained up to date by the Contractor. The register will include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.

### **8.10.2.4. Risk of Lead Pollution**

No man below the age of 18 years and no woman will be employed on the work of painting with products containing lead in any form. No paint containing lead or lead products will be used except in the form of paste or readymade paint. Face masks will be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

### **8.10.2.5. Risk Caused by Force' Majeure**

All reasonable precaution will be taken to prevent danger of the workers and the public from fire, flood, drowning, etc. All necessary steps will be taken for prompt first aid treatment of all injuries likely to be sustained during the course of work.

#### **8.10.2.6. Risk from Explosives**

Except as may be provided in the contract or ordered or authorised by the Engineer, the Contractor will not use explosives. Where the use of explosives is so provided or ordered or authorised, the Contractor will comply with the requirements of the following Sub-Clauses of this Clause besides the law of the land as applicable.

- The Contractor will at all times take every possible precaution and will comply with appropriate laws and regulations relating to the importation, handling, transportation, storage and use of explosives and will, at all times when engaged in blasting operations, post sufficient warning flagmen, to the full satisfaction of the Engineer.
- The Contractor will at all times make full liaison with and inform well in advance and obtain such permission as is required from all Government Authorities, public bodies and private parties whatsoever concerned or affected or likely to be concerned or affected by blasting operations.

#### **8.10.2.7. Malarial Risk**

The Contractor will, at his own expense, conform to all anti-malarial instructions given to him by the Engineer, including filling up any borrow pits which may have been dug by him.

Gravid, blood-laden mosquitoes cannot fly very far, so they generally bite within a kilometer or so of their breeding place. Thus borrow pits and any other water bodies created during the construction process will be situated 1 to 2 Km away from the human settlements. Pits dug up closer than these will be adequately drained to prevent water logging.

Similarly, compensatory measures for filling up part of the water bodies situated adjacent to the project corridors will be directed towards deepening of the water bodies concerned. This way the capacity of the water body remains the same, while water surface available for breeding of mosquitoes is reduced. This will have an additional advantage of decreased evaporation losses, which will be important in water-scarce corridors.

#### **8.10.2.8. First Aid**

At every workplace, a readily available first aid unit including an adequate supply of sterilized dressing material and appliances will be provided as per the Factory Rules. Workplaces, which are remote and far away from regular hospitals, will have indoor health units with one bed for every 250 workers. Suitable transport will be provided to facilitate take injured or ill person(s) to the nearest applicable hospital. At every workplace, an ambulance room containing the prescribed equipment and nursing staff will be provided as prescribed.

#### **8.10.2.9. Potable Water**

In every workplace at suitable and easily accessible places a sufficient supply of cold potable water (as per IS) will be provided and maintained. If the drinking water is obtained from an intermittent public water supply then, storage tanks will be provided. All water supply storage will be at a distance of not less than 15m from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of any latrine, drain or any other source of pollution, the well will be properly chlorinated before water is drawn from it for drinking water. All such wells will be entirely closed in and be provided with a trap door, which will be dust proof and

waterproof. A reliable pump will be fitted to each covered well. The trap door will be kept locked and opened only for cleaning or inspection, which will be done at least once a month.

#### **8.10.2.10. Hygiene**

The Contractor during the progress of work will provide, erect and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scales approved by the resident engineer.

There will be provided within the precincts of every workplace, latrines and urinals in an accessible place, and the accommodation, separately for each for these, as per standards set by the Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996. Except in workplaces provided with water-flushed latrines connected with a water borne sewage system, all latrines will be provided with dry-earth system (receptacles) which will be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. Receptacles will be tarred inside and outside at least once a year. If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular will be provided. There will be adequate supply of water, close to latrines and urinals.

All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place. Compliance with the relevant legislation must be strictly adhered to. Garbage bins must be provided in the camp and regularly emptied and the garbage disposed-off in a hygienic manner. Construction camps are to be sited away from vulnerable people and adequate health care is to be provided for the work force.

Unless the arrangement made by the local sanitary authority, arrangement for proper disposal of excreta by incineration at the workplace will be made by means of a suitable incinerator approved by the local medical health or municipal authorities. Alternatively, excreta may be disposed-off by putting a layer of night soils at the bottom of a permanent tank prepared for the purpose and covering it with 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight (by then it will turn into manure).

On completion of the works, the whole of such temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer.

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## Chapter 9. References

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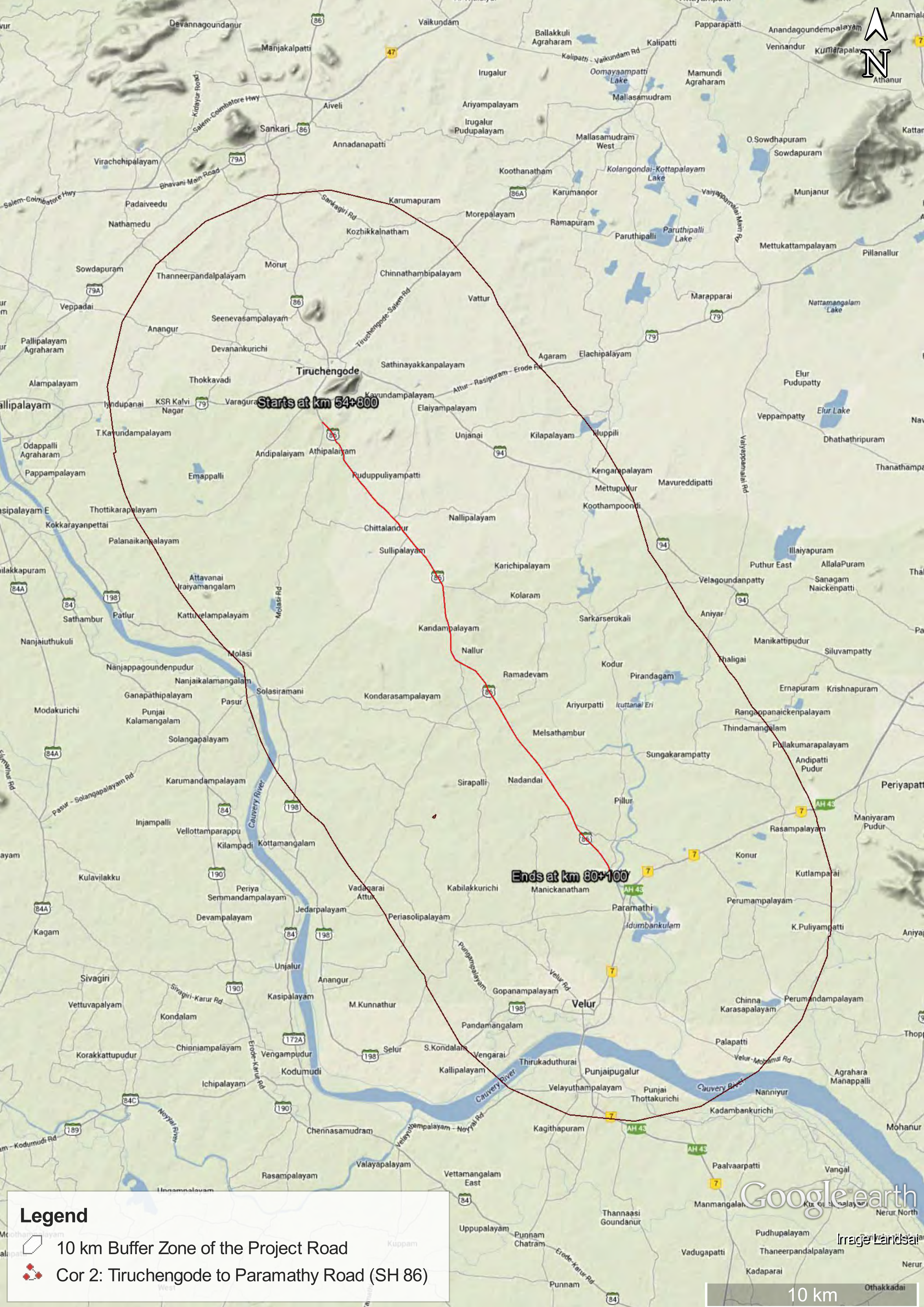
- Salem & Namakkal District Statistical Hand Book for (2010-2011)
- Salem & Namakkal District Official Websites
- Ground Water Scenario of Salem & Namakkal District by Central Ground Water Board,
- Field Reconnaissance Surveys
- India Meteorological Department, Pune
- Hydromet Division, India Meteorological Department, Salem & Namakkal Districts
- Environmental Profile of Salem & Namakkal District from ITCOT
- National Agriculture Development Project – District Agriculture Plan, 2008 – Salem & Namakkal District
- Consultation with Range Forest Officers and District Forest Officer, Namakkal.
- Toposheets and District Planning Map from Survey of India, Chennai

## **Annexures**

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## **Annexure 1.1. Google Map and Survey of India Toposheet Showing Project Influence Area (10km) of Phase I Roads under TNRSP II**







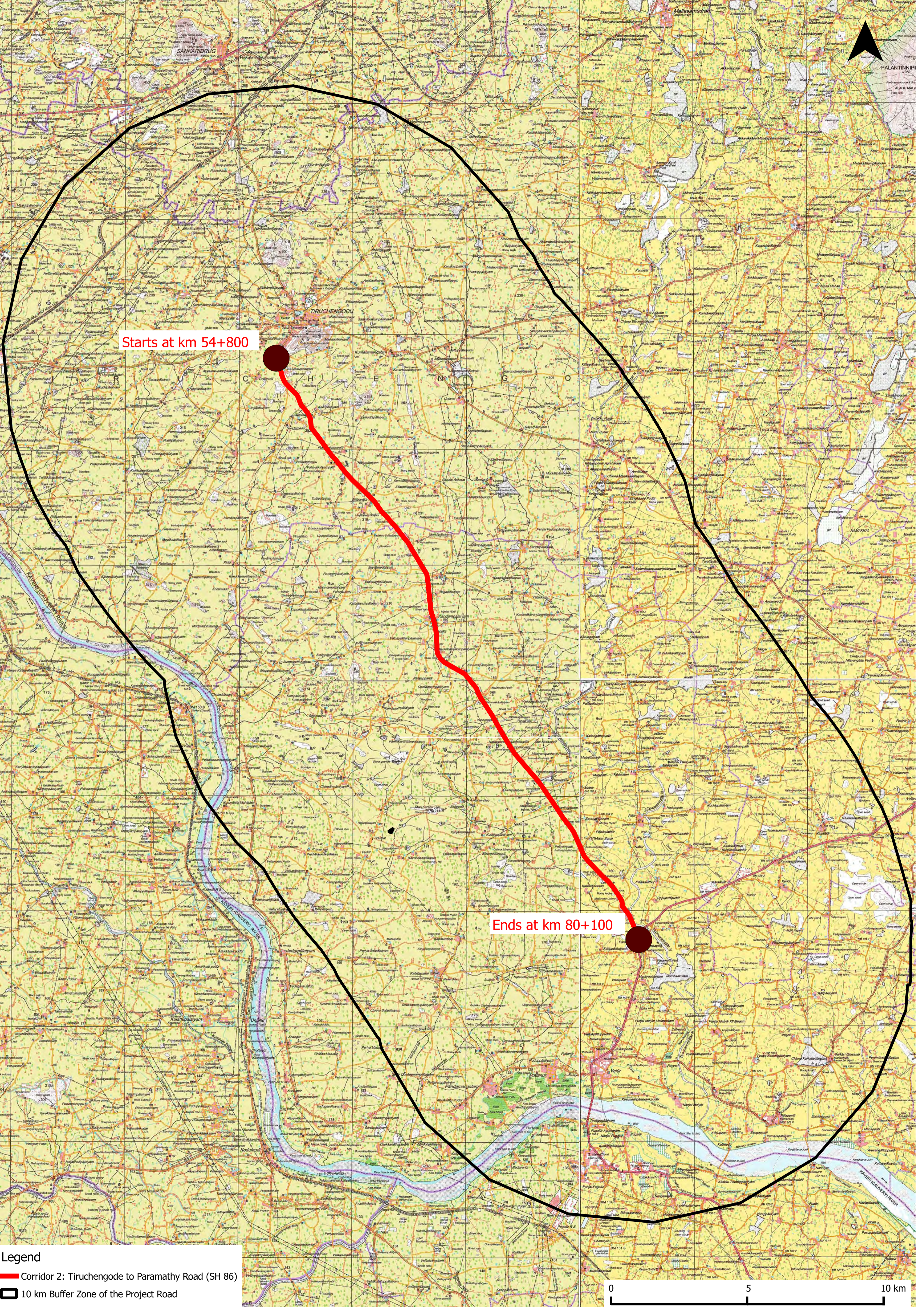
Starts at km 54+800

Ends at km 80+100

### Legend

-  10 km Buffer Zone of the Project Road
-  Cor 2: Tiruchengode to Paramathy Road (SH 86)

10 km



Starts at km 54+800

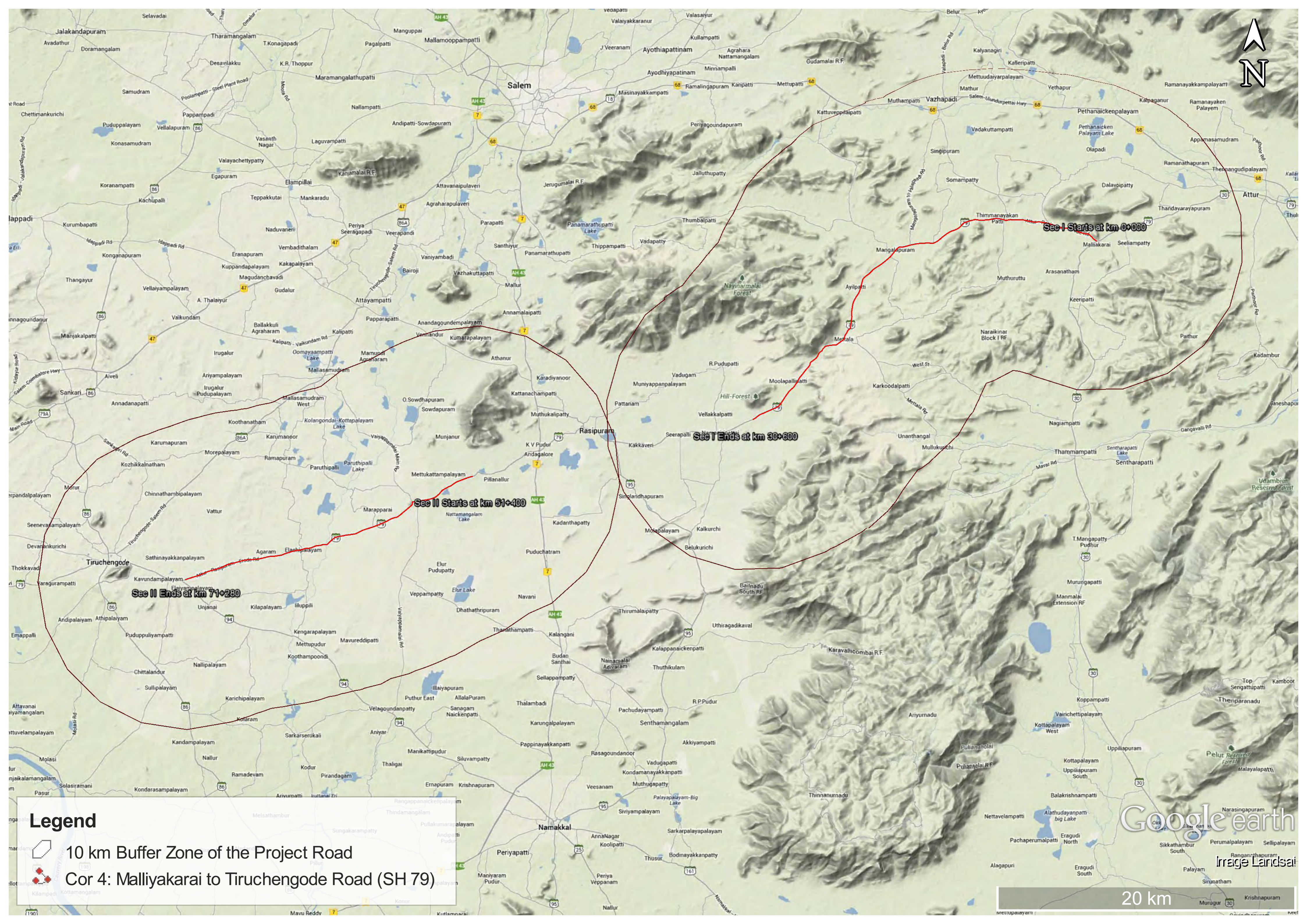
Ends at km 80+100

Legend

Corridor 2: Tiruchengode to Paramathy Road (SH 86)

10 km Buffer Zone of the Project Road







Sec I Starts at km 0+000

Sec I Ends at km 30+600

Sec II Starts at km 51+400

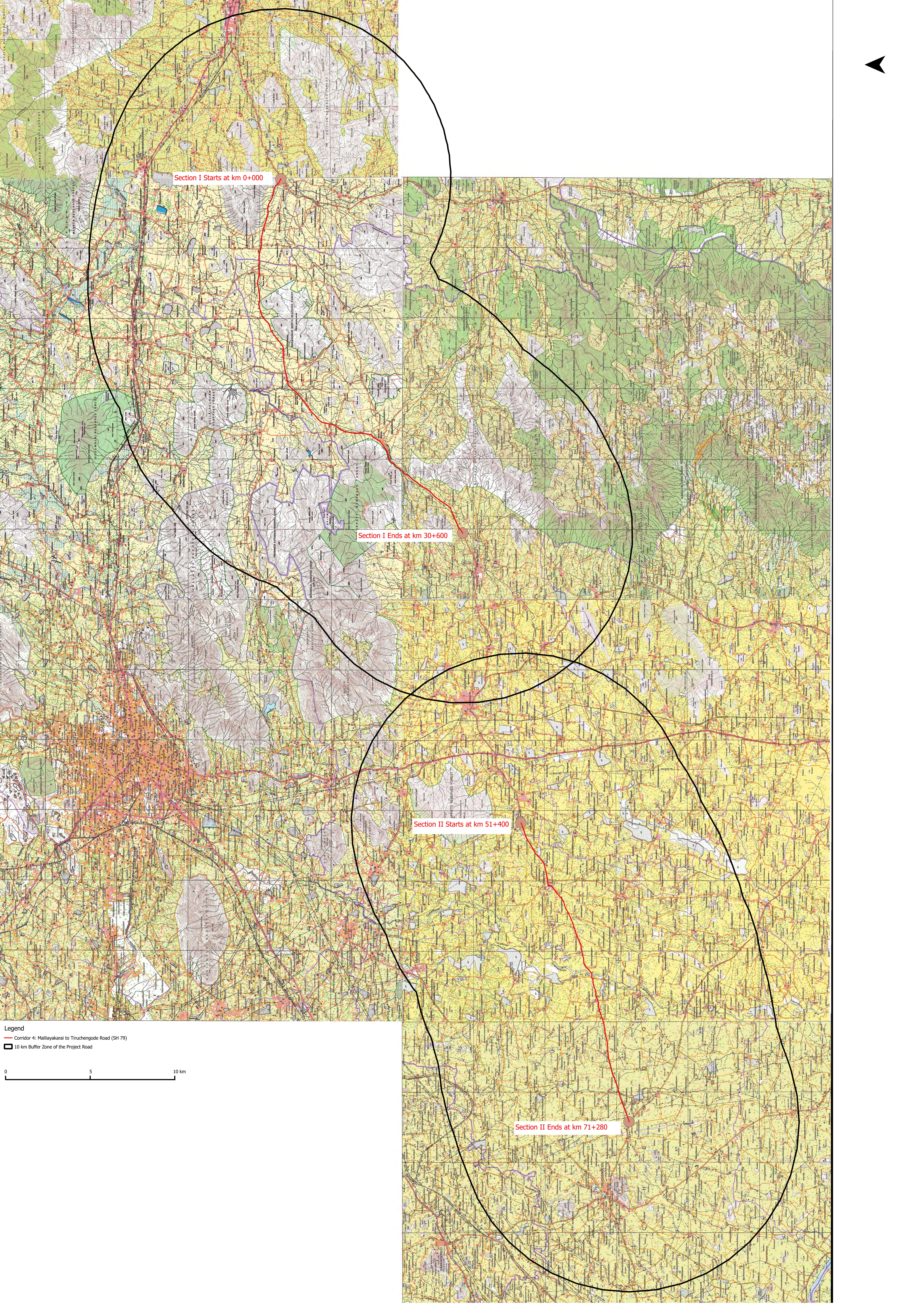
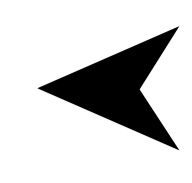
Sec II Ends at km 71+200

**Legend**

-  10 km Buffer Zone of the Project Road
-  Cor 4: Malliyakarai to Tiruchengode Road (SH 79)

Google earth  
Irrage Landsai

20 km



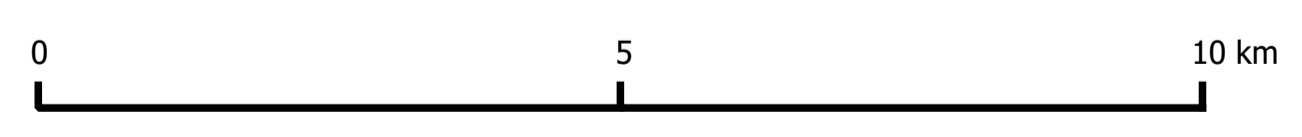
Section I Starts at km 0+000

Section I Ends at km 30+600

Section II Starts at km 51+400

Section II Ends at km 71+280

Legend  
Corridor 4: Malliyakarai to Tiruchengode Road (SH 79)  
10 km Buffer Zone of the Project Road







**Ends at km 13+200**

**Starts at km 0+600**

**Legend**

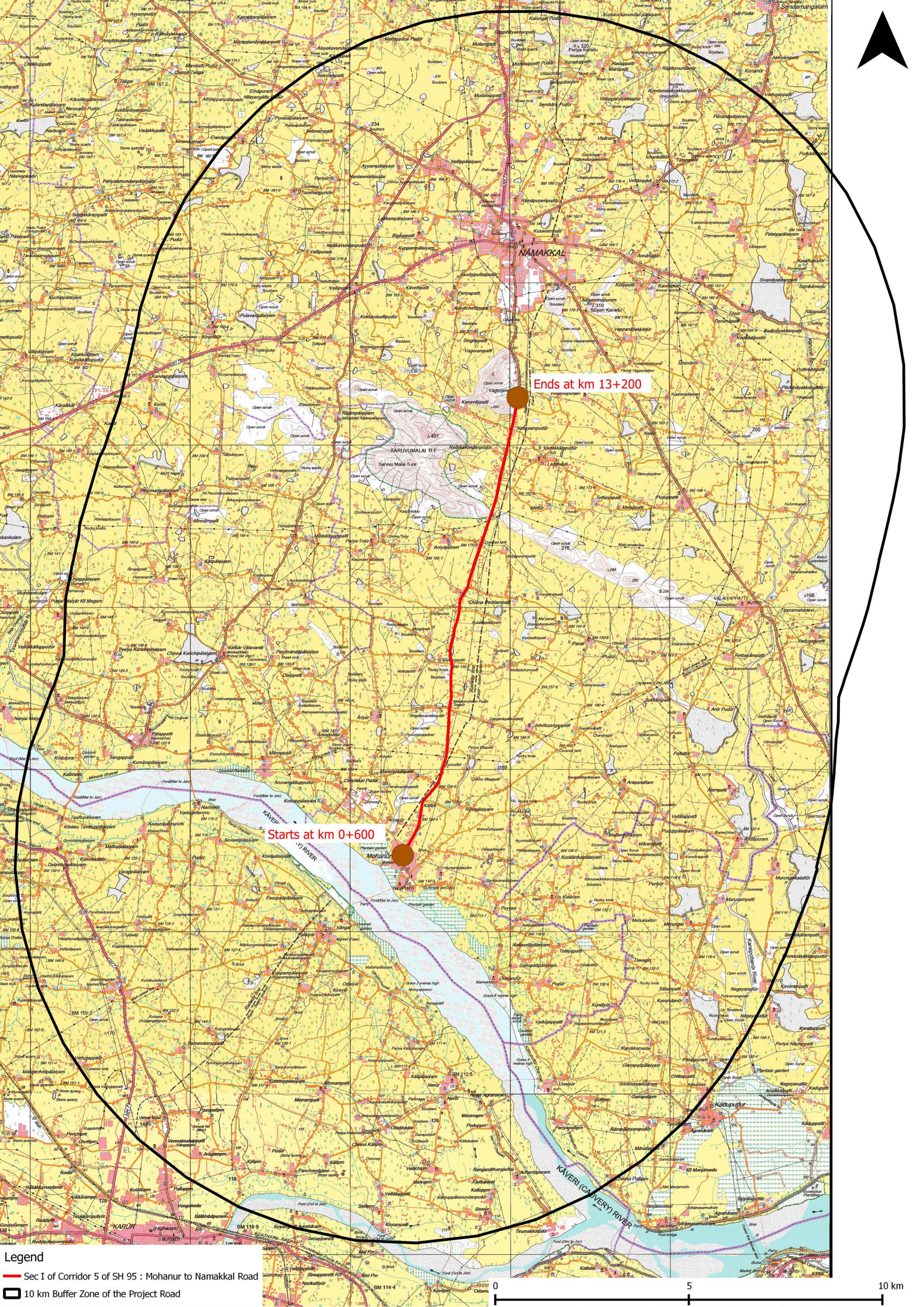
-  10 km Buffer Zone of the Project Road
-  Cor 5: Mohanur to Namakkal Road (SH 95)

Google earth

Image © 2014 CNES/Astrium

Image © 2014 DigitalGlobe

10 km



Ends at km 13+200

Starts at km 0+600

**Legend**  
 — Sec I of Corridor 5 of SH 95 : Mohanur to Namakkal Road  
 □ 10 km Buffer Zone of the Project Road



## Annexure 2.1.Chainage wise Details of Typical Cross Section

### Tiruchengode to Paramathy Section of Road No. 2 (SH 86)

Sl. No.	Existing Chainage		Length (km)	Design Chainage		Length (Km)	TCS Type
	From	To		From	To		
1	54+800	55+600	0.80	54+800	55+597	0.80	C2-R-R
2	55+600	55+750	0.15	55+597	55+734	0.14	C2-R-N
3	55+750	59+400	3.65	55+734	59+390	3.66	C2-R-R
4	59+400	60+000	0.60	59+390	59+990	0.60	C2-V-R
5	60+000	61+000	1.00	59+990	60+988	1.00	C2-R-R
6	61+000	63+400	2.40	60+988	63+388	2.40	C2-R-O
7	63+400	65+100	1.70	63+388	65+088	1.70	C2-V-O
8	65+100	66+000	0.90	65+088	65+986	0.90	C2-U-O
9	66+000	66+500	0.50	65+986	66+486	0.50	C2-V-O
10	66+500	67+000	0.50	66+486	66+986	0.50	C2-R-O
11	67+000	69+900	2.90	66+986	69+883	2.90	C2-R-R
12	69+900	70+600	0.70	69+883	70+583	0.70	C2-V-R
13	70+600	71+000	0.40	70+583	70+983	0.40	C2-R-R
14	71+000	71+380	0.38	70+983	71+363	0.38	C2-R-O
15	71+380	71+530	0.15	71+363	71+515	0.15	C2-R-R
16	71+530	74+000	2.47	71+515	73+983	2.47	C2-R-O
17	74+000	75+000	1.00	73+983	74+983	1.00	C2-V-O
18	75+000	79+000	4.00	74+983	78+983	4.00	C2-R-O
19	79+000	79+200	0.20	78+983	79+183	0.20	C2-R-R
20	79+200	80+000	0.80	79+183	79+980	0.80	C2-V-R
21	80+000	80+600	0.60	79+980	80+580	0.60	C2-R-R
22	80+600	81+000	0.40	80+580	80+973	0.39	C2-U-R
<b>Existing Length</b>			<b>26.2</b>	<b>Design Length</b>		<b>26.17</b>	

### Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)

Existing Chainage		Existing Length (km)	Design Chainage		Design Length (km)	TCS Type
From	To		From	To		
0+000	0+320	0.320	0+000	0+320	0.320	C4 - U - P
0+320	0+400	0.080	0+320	0+400	0.080	C4 - U - N
0+400	0+500	0.100	0+400	0+500	0.100	C4 - R - N
0+500	2+670	2.170	0+500	2+670	2.170	C4 - R - P
2+670	3+130	0.460	2+670	3+130	0.460	C4 - R - N
3+130	4+350	1.220	3+130	4+350	1.220	C4 - R - P
4+350	4+900	0.550	4+350	4+900	0.550	C4 - V - P
4+900	6+200	1.300	4+900	6+200	1.300	C4 - R - P
6+200	6+600	0.400	6+200	6+600	0.400	C4 - U - P
6+600	8+260	1.660	6+600	8+260	1.660	C4 - R - P
8+260	8+650	0.390	8+260	8+650	0.390	C4 - R - N
8+650	11+713	3.063	8+650	11+700	3.050	C4 - R - P
11+713	12+013	0.300	11+700	12+000	0.300	C4 - U - P
12+013	12+613	0.600	12+000	12+600	0.600	C4 - U - O
12+613	13+507	0.894	12+600	13+500	0.900	C4 - V - O
13+507	15+020	1.513	13+500	15+000	1.500	C4 - U - O
15+020	15+204	0.184	15+000	15+200	0.200	C4 - U - P

Existing Chainage		Existing Length (km)	Design Chainage		Design Length (km)	TCS Type
From	To		From	To		
15+204	17+600	2.396	15+200	17+600	2.400	C4 - R - P
17+600	19+000	1.400	17+600	19+000	1.400	C4 - V - P
19+000	20+000	1.000	19+000	20+000	1.000	C4 - R - P
20+000	20+500	0.500	20+000	20+500	0.500	C4 - R - O
20+500	20+600	0.100	20+500	20+600	0.100	C4 - V - O
20+600	20+800	0.200	20+600	20+800	0.200	C4 - V - N
20+800	21+100	0.300	20+800	21+100	0.300	C4 - V - O
21+100	22+013	0.913	21+100	22+000	0.900	C4 - U - O
22+013	22+543	0.530	22+000	22+530	0.530	C4 - R - O
22+543	23+900	1.357	22+530	23+880	1.350	C4 - F - O - RHS
23+900	24+530	0.630	23+880	24+500	0.620	C4 - V - O
24+530	24+926	0.396	24+500	24+910	0.410	C4 - F - O - LHS
24+926	29+616	4.690	24+910	29+600	4.690	C4 - V - O
29+616	29+914	0.298	29+600	29+920	0.320	C4 - V - N
29+914	30+620	0.706	29+920	30+635	0.715	C4 - V - O

**Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)**

Existing Chainage		Existing Length (km)	Design chainage		Design Length (km)	TCS Type
From	To		From	To		
51+300	54+440	3.140	51+300	54+300	3.000	C4 - R - P
54+440	55+550	1.110	54+300	55+500	1.200	C4 - U - P
55+550	59+956	4.406	55+500	59+900	4.400	C4 - R - P
59+956	60+358	0.402	59+900	60+300	0.400	C4 - R - N
60+358	61+520	1.162	60+300	61+450	1.150	C4 - R - P
61+520	62+080	0.560	61+450	62+000	0.550	C4 - R - N
62+080	64+972	2.892	62+000	64+892	2.890	C4 - V - P
64+972	71+280	6.308	64+892	71+190	6.298	C4 - R - P
<b>Existing length</b>		19.980	<b>Design length</b>		19.890	

**Mohanur to Namakkal Section of Road No. 5 (SH 95)**

Sl No.	Existing Chainage		Length (km)	Design Chainage		Length (km)	ROW	TCS Type
	From	To		From	To			
1	15+650	16+250	0.6	0+000	0+584	0.584	Min 16	5U -P
2	0+584	2+100	1.516	0+584	2+100	1.516	Min 20	5U -P
3	2+100	2+445	0.345	2+100	2+450	0.35	23	5R -N
4	2+445	2+795	0.35	2+450	2+800	0.35	23	5R -P
5	2+795	3+105	0.31	2+800	3+100	0.3	16	5V -P
6	3+105	3+925	0.82	3+100	3+950	0.85	23	5R -O
7	3+925	4+285	0.36	3+950	4+310	0.36	16	5V -P
8	4+285	5+055	0.77	4+310	5+070	0.76	23	5R -P
9	5+055	5+385	0.33	5+070	5+400	0.33	16	5V -P
10	5+385	6+285	0.9	5+400	6+300	0.9	23	5R -P
11	6+285	6+520	0.235	6+300	6+530	0.23	16	5V -P
12	6+520	6+930	0.41	6+530	6+950	0.42	23	5R -N
13	6+930	7+810	0.88	6+950	7+830	0.88	23	5R -P
14	7+810	8+210	0.4	7+830	8+230	0.4	16	5V -P



Sl No.	Existing Chainage		Length (km)	Design Chainage		Length (km)	ROW	TCS Type
	From	To		From	To			
15	8+210	9+840	1.63	8+230	9+870	1.64	23	5R-P
16	9+840	10+075	0.235	9+870	10+100	0.23	16	5V-P
17	10+075	10+700	0.625	10+100	10+730	0.63	23	R-P
18	10+700	11+000	0.3	10+730	11+030	0.3	19.5/23	R-P
19	11+000	12+465	1.465	11+030	12+500	1.47	23	R-P
20	12+465	12+815	0.35	12+500	12+850	0.35	16	V-P
21	12+815	13+165	0.35	12+850	13+200	0.35	23	5R-P
22	13+165	13+350	0.185	13+200	13+385	0.185	16	5V-P



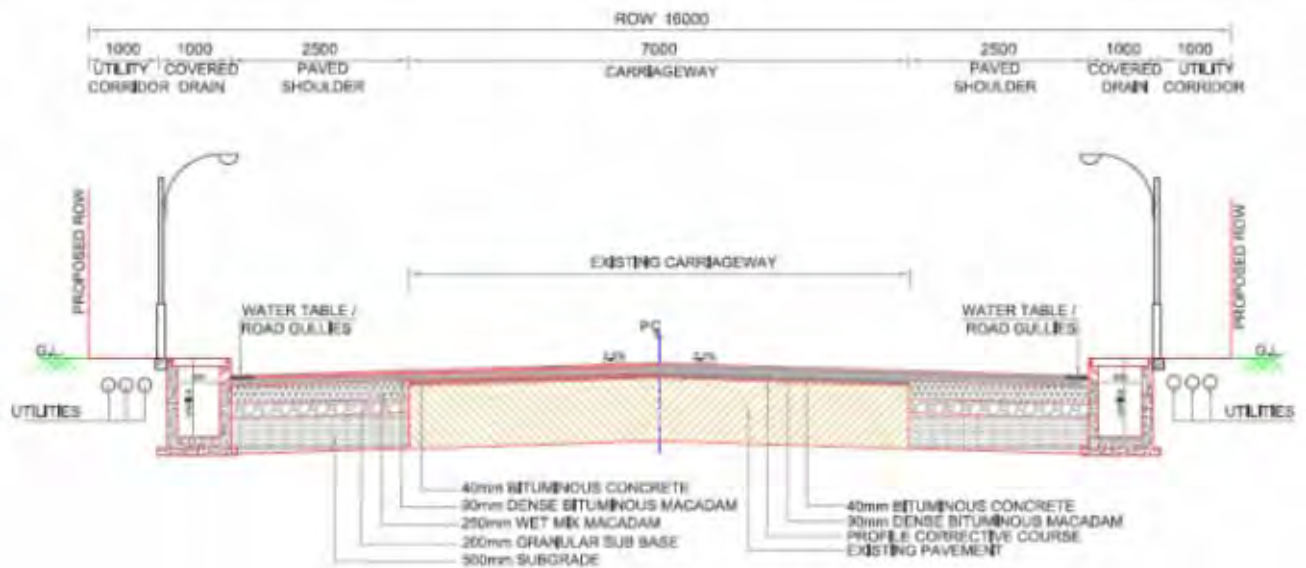


Figure 5.3 C2-V-O : Two Lane Carriageway with Paved Shoulder in Village Area (Overlay)

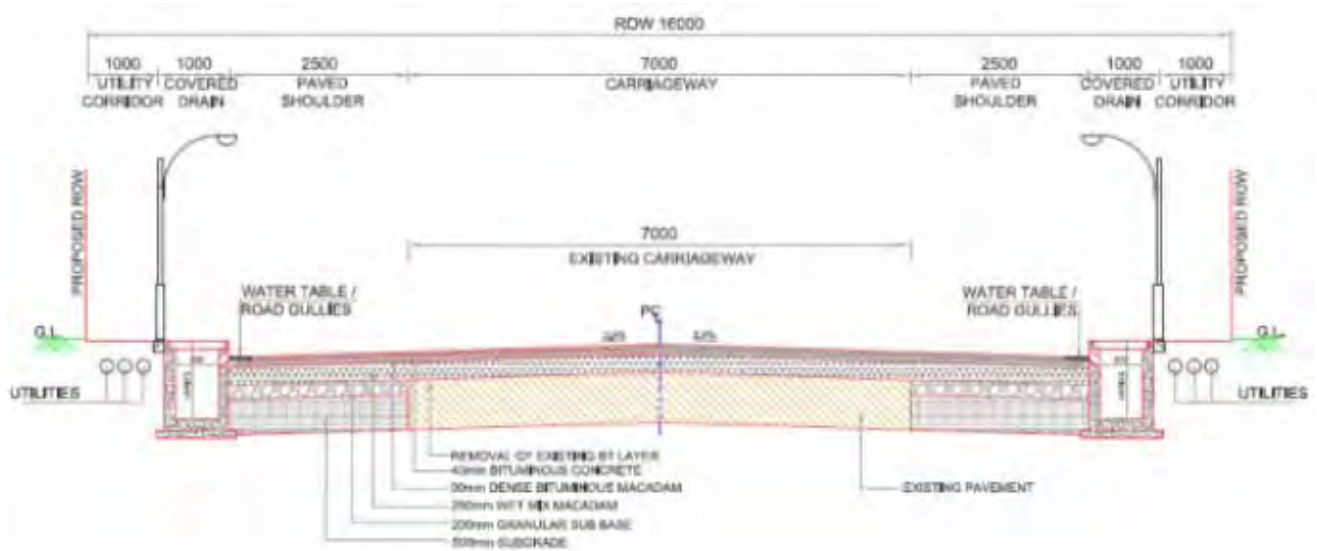
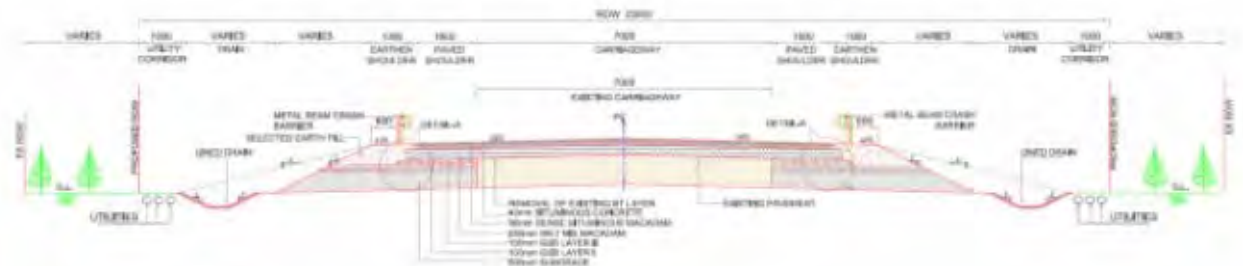
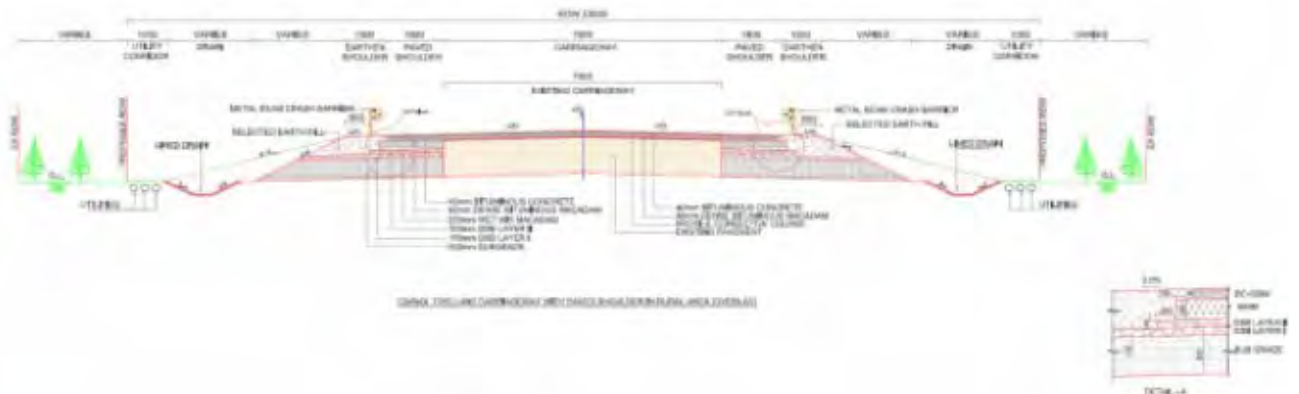
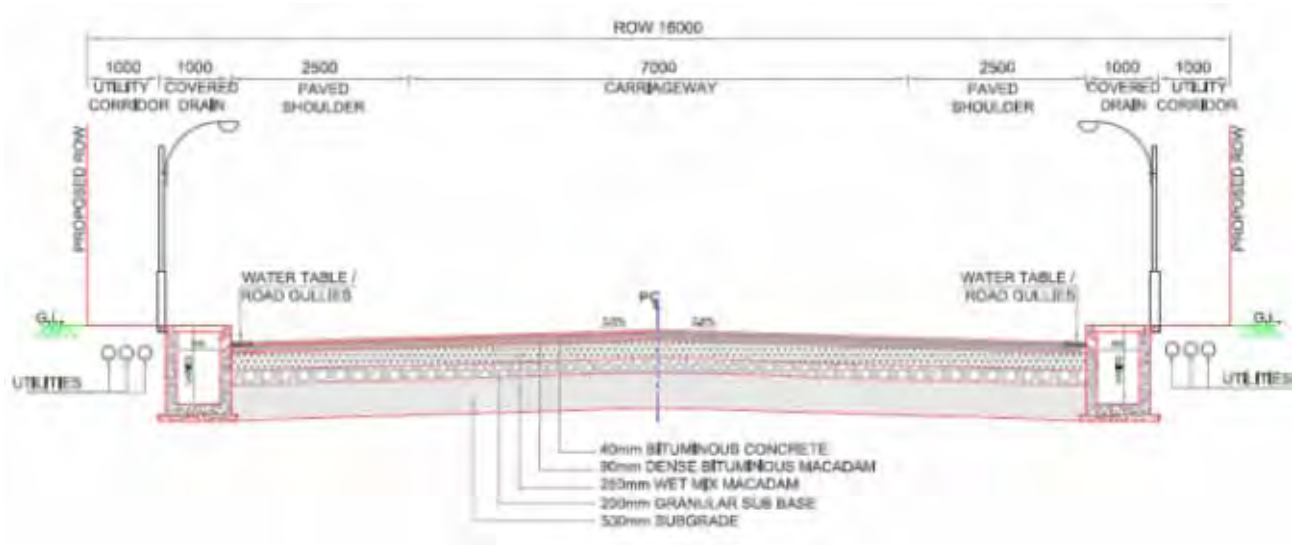
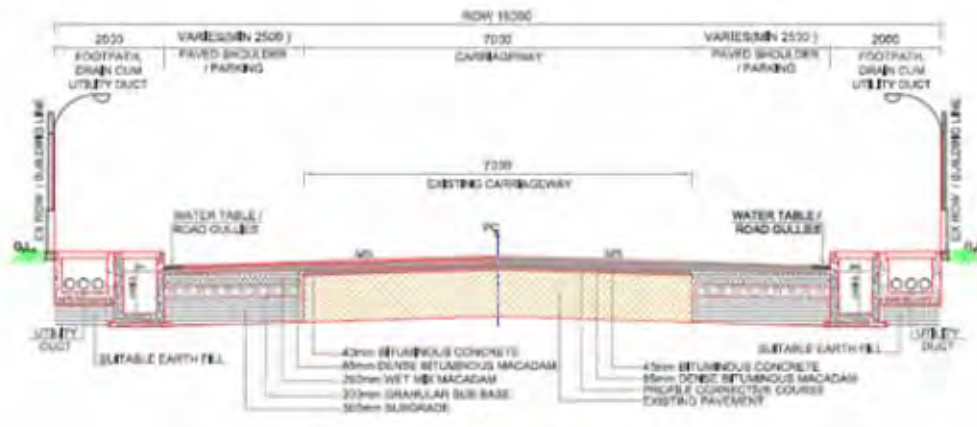


Figure 5.4 C2-V-R (P) : Two Lane Carriageway with Paved Shoulder in Village Area (Partial Depth Reconstruction)

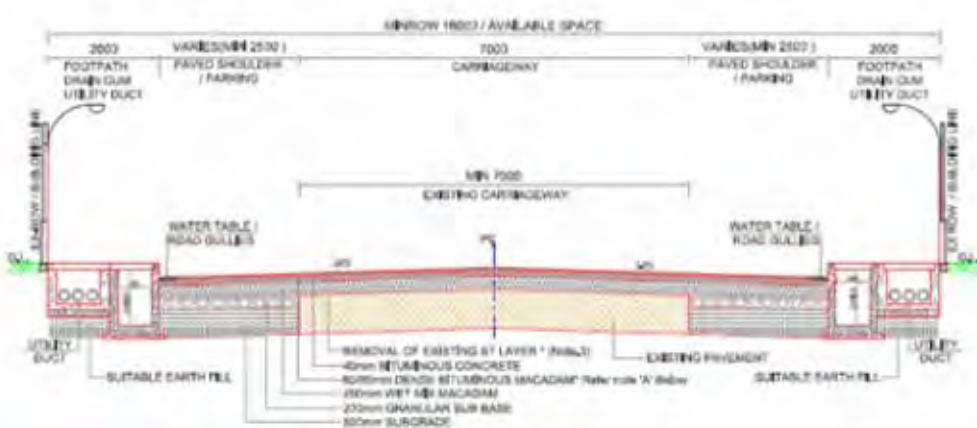




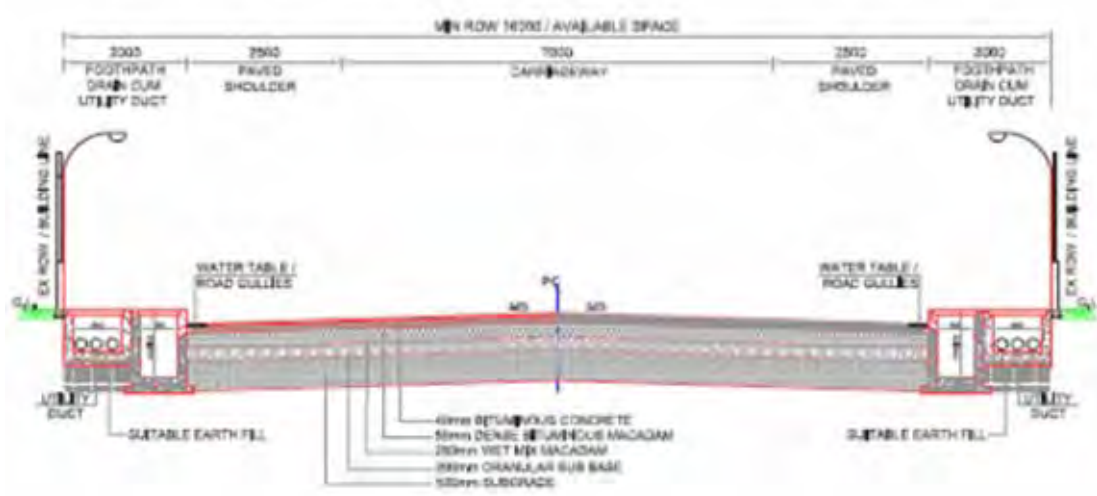
**Malliyakarai to Rasipuram and Rasipuram to Tiruchengode Sections of Road No. 4 (SH 79)**



**Figure.5.1: C4-U - O Two Lane Carriageway with Paved Shoulder in Urban Area (Overlay)**



**Figure.5.2: C4-U – P Two Lane Carriageway with Paved Shoulder in Urban Area (Partial Reconstruction)**



**Figure.5.3: C4-U – N Two Lane Carriageway with Paved Shoulder in Urban Area (New Construction)**

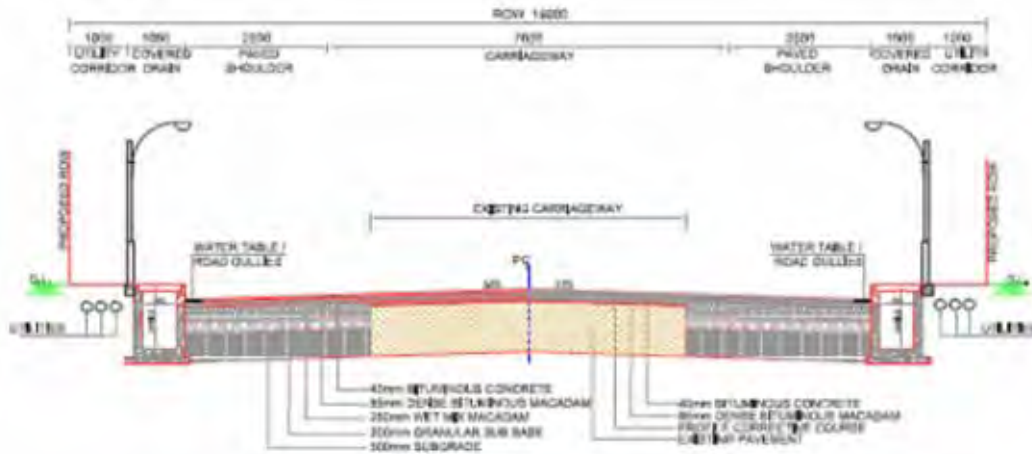


Figure.5.4: C4-V – O Two Lane Carriageway with Paved Shoulder in Village Area (Overlay)

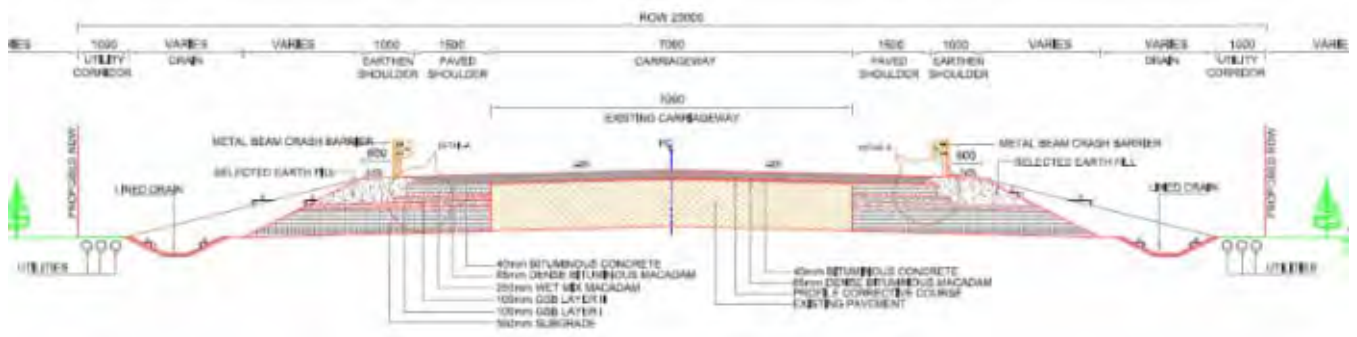


Figure.5.7: C4-R – O Two Lane Carriageway with Paved Shoulder in Rural Area (Overlay)

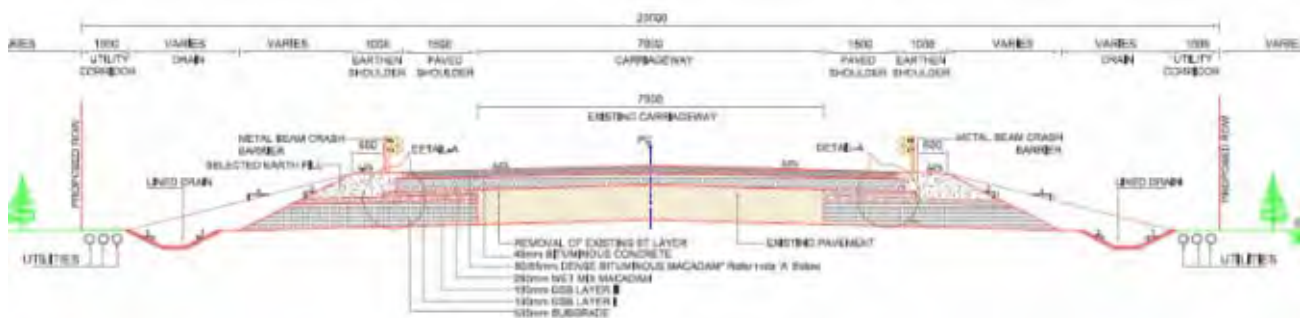


Figure.5.8: C4-R – P Two Lane Carriageway with Paved Shoulder in Rural Area (Partial Reconstruction)

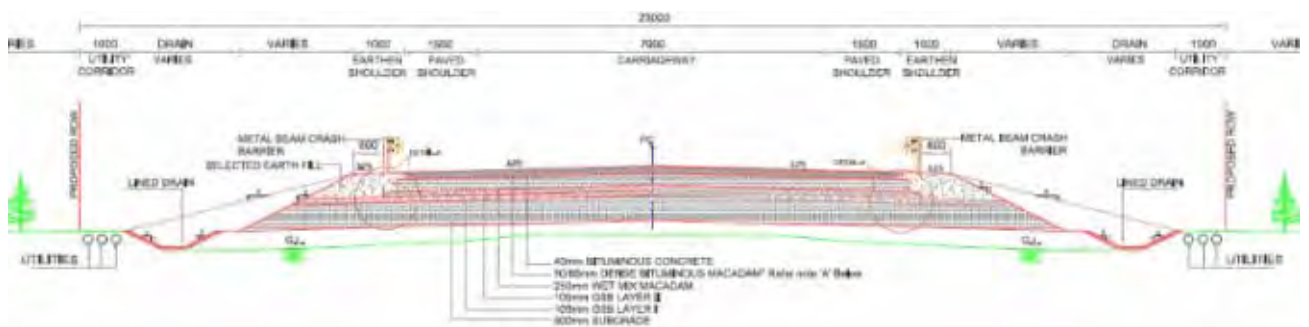


Figure.5.9: C4-R – N Two Lane Carriageway with Paved Shoulder in Rural Area (New Construction)

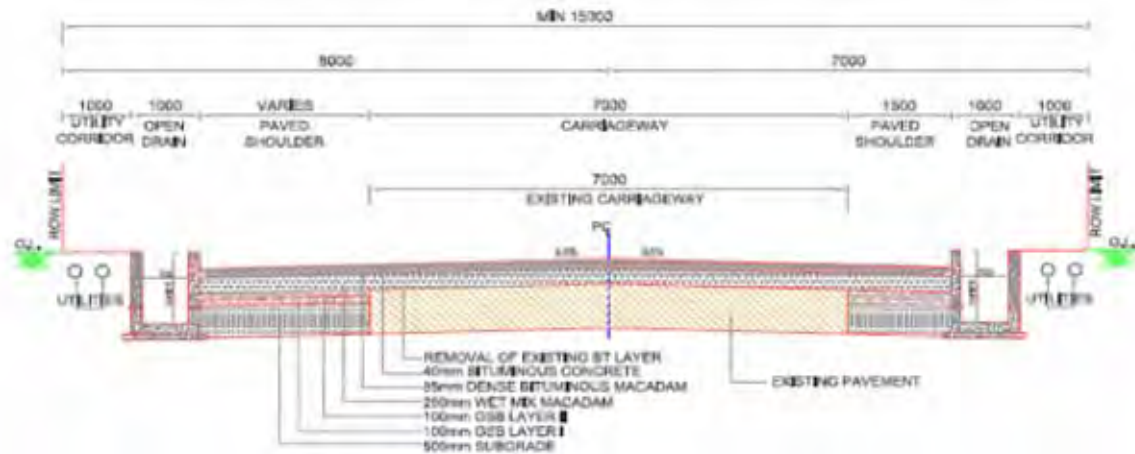


Figure.5.10: C4-F – O Two Lane Carriageway with Paved Shoulder in Forest section - RHS (Over lay)

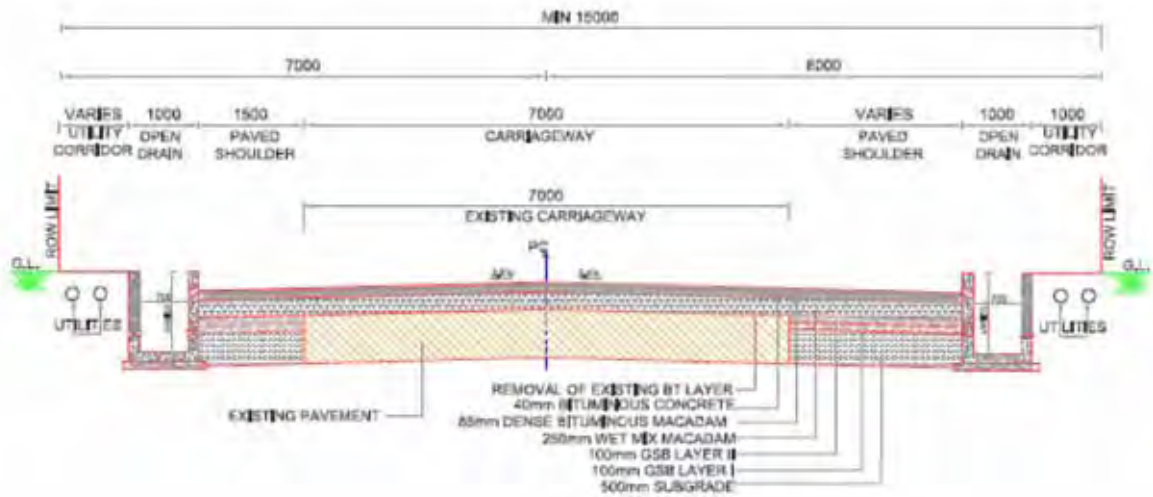


Figure.5.11: C4-F – O Two Lane Carriageway with Paved Shoulder in Forest Area – LHS (Overlay)

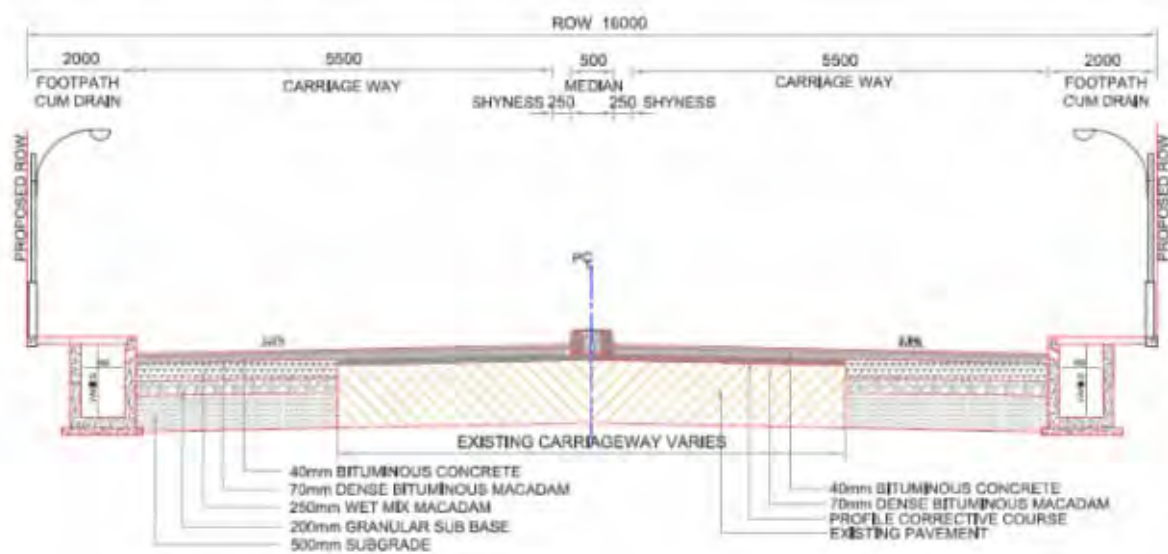
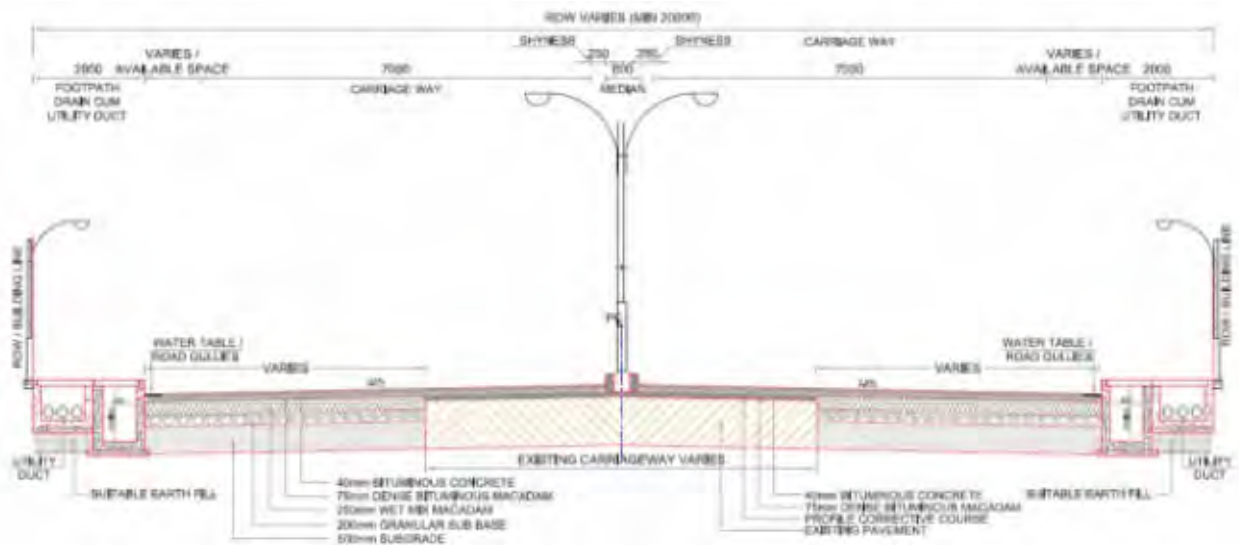


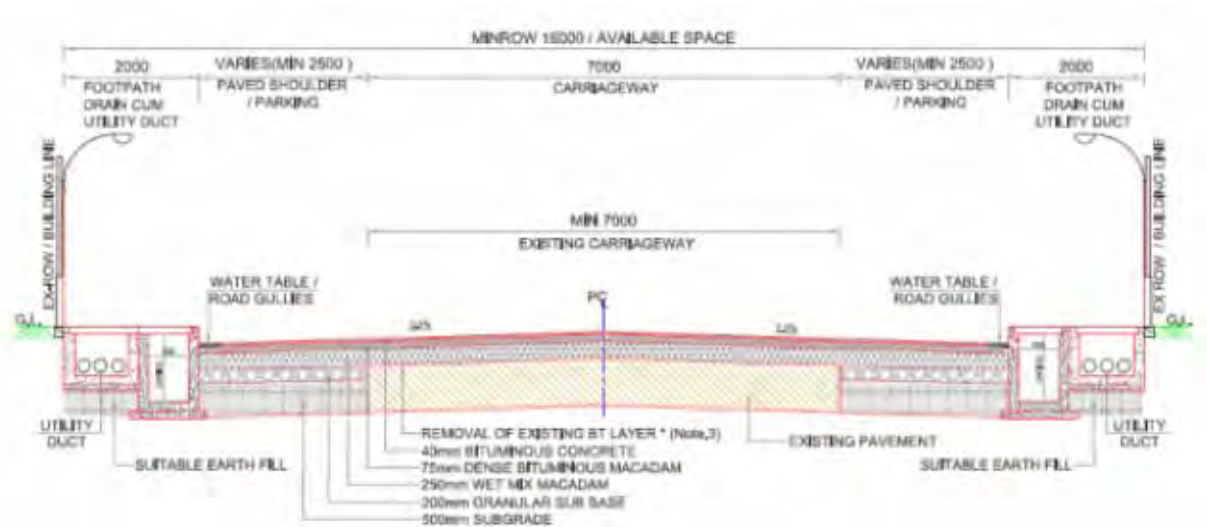
Figure 5.12: C4-U – P Intermediate carriageway in Vaiyappanmalai Location (Partial depth reconstruction)



**Mohanur to Namakkal Section of Road No. 5 (SH 95)**



**Fig 5.1 C5 –U-P- Four Lane Divided Carriageway with Paved Shoulder/Available Space in Urban Area from Ch.0+600 To 2+100 with Varies ROW from 20m To 30m**



**Fig 5.2 C5 –U-P- Two Lane Carriageway with Paved Shoulder/Available Space in Urban Area from Ch. 0+000 To 0+600 with Varies ROW from 16m To 20m**

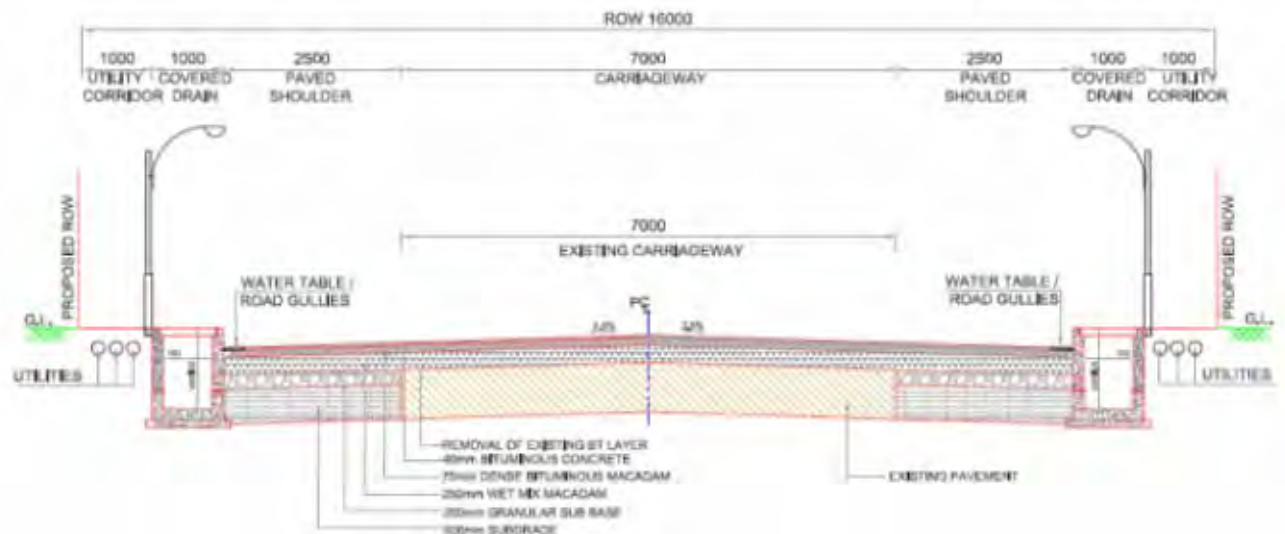


Fig 5.3 C5 –V-P- Two Lane Carriageway with Paved Shoulder in Village Area

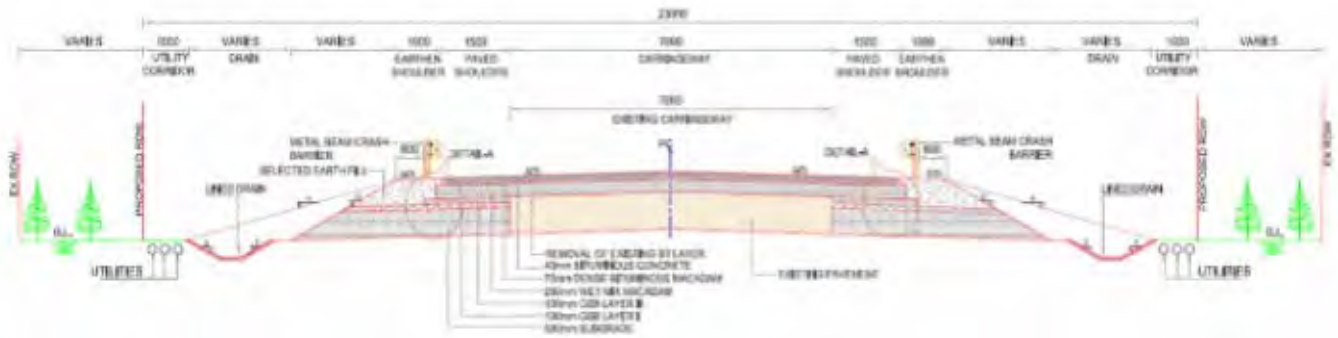


Fig 5.4 C5 –R-P- Two Lane Carriageway with Paved Shoulder in Rural Area

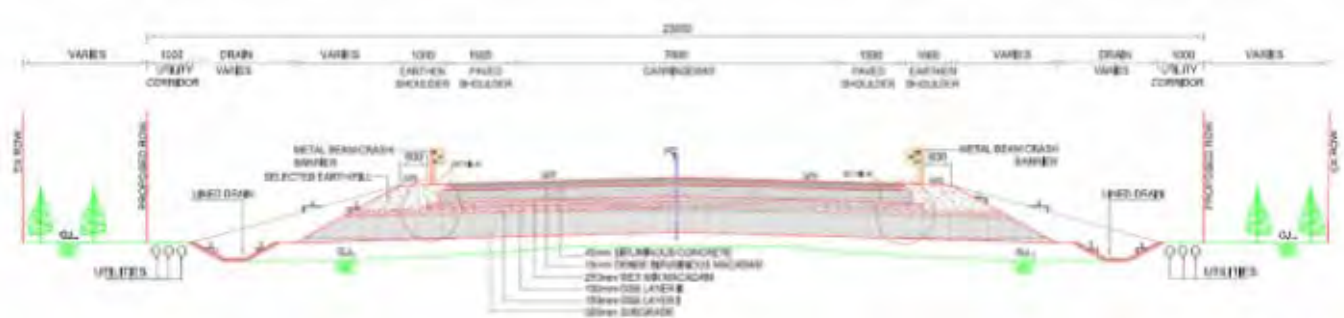


Fig 5.5 C5 – R-N- Two Lane Carriageway with Paved Shoulder in Realignment Area

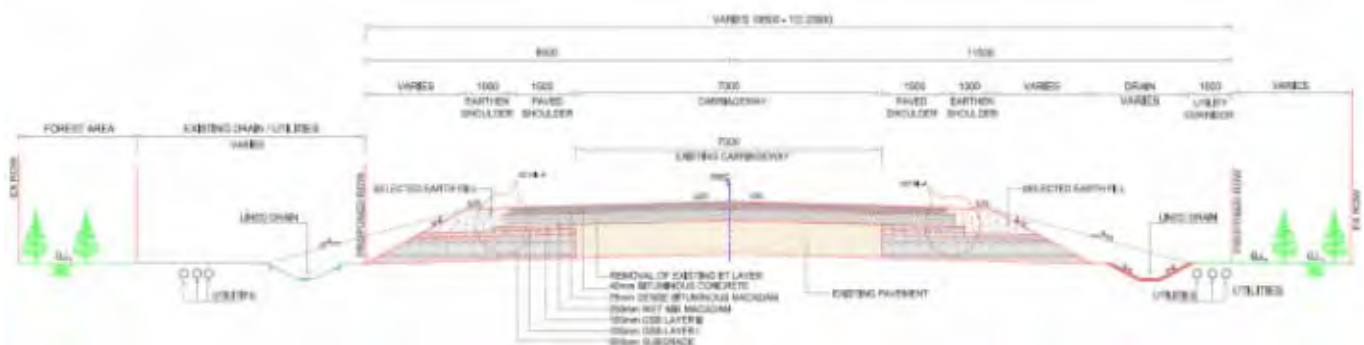


Fig 5.6 C5 –R-P- Two Lane Carriageway Paved Shoulder in Forest Area

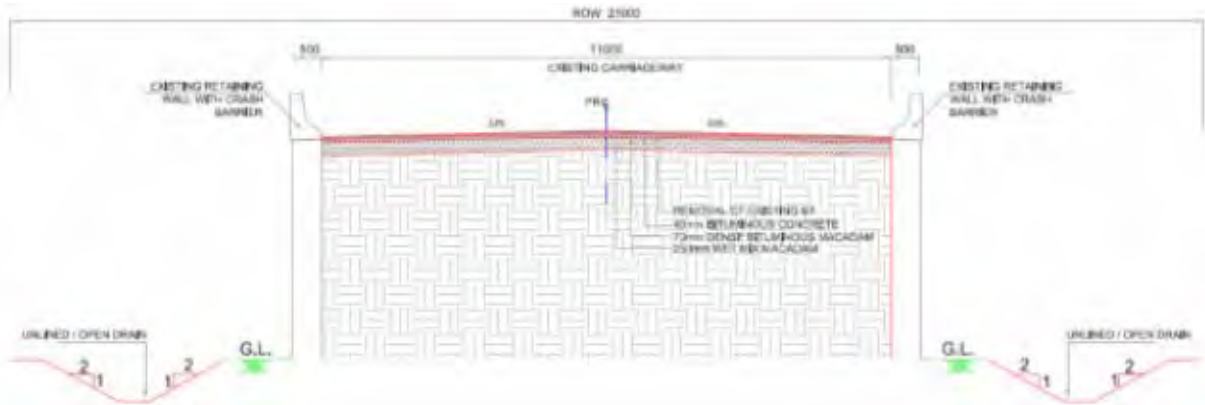


Fig 5.7 C5 –R-O- Existing Two Lane ROB Approach

### **Annexure 2.3. Codes of Practice of Indian Road Congress (IRC) in terms of Environment**

<b>Sl. No.</b>	<b>IRC Code</b>	<b>Description</b>
1	IRC:34-2011	Recommendations for Road Construction in Areas Affected by Water Logging, Flooding and/or Salts Infestation (First Revision)
2	IRC:56-2011	Recommended Practices for Treatment of Embankment and Roadside Slopes for Erosion Control (First Revision)
3	IRC:90-2010	Guidelines of Selection, Operation and Maintenance of Bituminous Hot Mix Plant (First Revision)
4	IRC:103-1988	Guidelines for Pedestrian Facilities
5	IRC:104-1988	Guidelines for Environmental Impact Assessment of Highway Projects
6	IRC:SP:21-2009	Guidelines on Landscaping and Tree Plantation
7	IRC: SP: 42 – 1994	Guidelines on Road Drainage
8	IRC: SP: 44 – 1996	Highway Safety Code
9	IRC: SP: 48 – 1998	Hill Road Manual
10	IRC: SP: 88 - 2010	Road Safety Audit Manual

## Annexure 4.1. List of Flora & Fauna found along the Project Region

### List of Flora with IUCN Status

S No	Common Name(English)	Vernacular Name(Tamil)	Botanical Name	IUCN Status
1	Neem	Vembu	<i>Azadirachta indica</i>	Not Assessed
2	Palm	Panei	<i>Borassus flabellifer</i>	Not Assessed
3	Tamrind	Puli	<i>Tamarindus indica</i>	Not Assessed
4	Dyers's oleander	Palamaram	<i>Wrightia tinctoria</i>	Not Assessed
5	White barked Acacia	velvelam	<i>Acacia leucophloea</i>	Not Assessed
6	Babul	Karuvellam	<i>Acacia nilotica</i>	Not Assessed
7	Bael tree	Vilma	<i>Aegle marmelos</i>	Not Assessed
8	Banyan tree	Alamaram	<i>Ficus benghalensis</i>	Not Assessed
9	Ber	llanthei	<i>Zizyphus jujube</i>	Not Assessed
10	Copperpod	Perunkonrai	<i>Peltophorum pterocarpum</i>	Not Assessed
11	Drumstick tree	Murungai	<i>Moringa oleifera</i>	Not Assessed
12	Gulmohar	Thanga mohar, Vadanaranyana	<i>Delonix regia</i>	Least Concern
13	Indian Cork tree	Maramalli,	<i>Millingtonia hortensis</i>	Not Assessed
14	Jamun	Naaval Pazham	<i>Syzygium cumini</i>	Not Assessed
15	Pongamia	Pungai	<i>Pongamia pinnata</i>	Least Concern
16	Prosopis	velikathan, vanini	<i>Prosopis juliflora</i>	Not Assessed
17	Custard apple	Seetha pazham	<i>Annona squamosa</i>	Not Assessed
18	Curryleaf	Kadi Patta	<i>Murraya koenigii</i>	Not Assessed
19	Coconut	Thengai	<i>Cocos nucifera</i>	Not Assessed
20	Pomaganate	maadulampazham	<i>Punica granatum</i>	Least Concern
21	Temple tree	Kallimandarai, chembaka maram	<i>Plumeria rubra</i>	Not Assessed
22	Creape Jasmine	Nandiar vattai	<i>Tabernaemontana divaricata</i>	Not Assessed
23	Hill Mango	Kiluvai	<i>Balsamodendron caudatum</i>	Not Assessed
24	White Gulmohar	Vadana	<i>Delonix elata</i>	Least Concern
25	Black Wattle	Oonzi	<i>Acacia mearnsii</i>	Not Assessed

S No	Common Name(English)	Vernacular Name(Tamil)	Botanical Name	IUCN Status
26	wild almond tree	Pee maram	<i>Sterculia foetida</i>	Not Assessed
27	Indian Elm	Aya maram	<i>Holoptelea integrifolia</i>	Not Assessed
28	Bahunia	chemmonadarei	<i>Bahunia sp</i>	Not Assessed
29	Singapore Cherry	Cherry maram, Ten pazham	<i>Muntingia calabura</i>	Not Assessed
30	Three leaved caper	Mavalikaya	<i>Crataeva religiosa</i>	Not Assessed
31	Indian Siris	Vaakai	<i>Acacia lebbek</i>	Not Assessed
32	Badam	Badam	<i>Terminalia catappa</i>	Not Assessed
33	Wood apple	velamaram	<i>Limonia elaphantum</i>	Not Assessed
34	Indian licorice	Kunnimaram	<i>Abrus precatorius</i>	Not Assessed
35	Madras Thorn,Sweet tamarind	kodukkappuli	<i>Pithecellobium dulce</i>	Not Assessed
36	Quadrangular-Chaste Tree	Nochi maram	<i>Vetex Negundo</i>	Not Assessed
37	Soundal	Soundal	<i>Soundal</i>	Not Assessed
38	Thingam	Udaya maram	<i>Lannea coromandelica</i>	Not Assessed
39	Hairy Sterculia	Vakkana maram	<i>Sterculia villosa</i>	Not Assessed
40	Silpa maram	Silpa maram	<i>Silpa maram</i>	Not Assessed
41	Teak	Thekku	<i>Tectona grandis</i>	Not Assessed
42	Oleander	Arali	<i>Nerium indicum</i>	Not Assessed
43	Peepal	Arasu Maram	<i>Ficus religiosa</i>	Not Assessed
44	Indian Mulberry	Nona maram	<i>Morinda citrifolia</i>	Not Assessed
45	Headache tree, Spinous fire brand teak	Minnamaram	<i>Premana serratifolia</i>	Not Assessed
46	Mahuva	Iluppei Maram	<i>Madhuca longifolia</i>	Not Assessed
47	Indian Laurel Fig	Icchi Maram	<i>Ficus microcarpa</i>	Not Assessed
48	Kino Tree	Venkai	<i>Pterocarpus marsupium</i>	Vulnerable
49	udippu maram	udippu maram	<i>Eriolaena candollei</i>	Not Assessed
50	kaaramullu	kaaramullu	<i>Solanum indicum</i>	Not Assessed
51	Bastard Cedar	mala veppu	<i>Chukrasia velutina</i>	Not Assessed
52	poolam chedy	poolam chedy	<i>poolam chedy</i>	Not Assessed

S No	Common Name(English)	Vernacular Name(Tamil)	Botanical Name	IUCN Status
53	American Sumac	kona puliyanka	<i>Caesalpinia coriaria</i>	Not Assessed
54	Silk cottom	Illavam panju	<i>Ceiba pentandra</i>	Not Assessed
55	Mango	Mamaram	<i>Mangifera indica</i>	Data Deficient
56	Rain tree	Mazhai-maram	<i>Samanea saman</i>	Not Assessed
57	Ashoka tree	Asoka	<i>Saraca asoca</i>	Vulnerable
58	Goldenshower	Konnai	<i>Cassia fistula</i>	Not Assessed
59	Karunkali	Karunkali	<i>Karunkali</i>	Not Assessed
60	Guava	Koyya	<i>Psidium guajava</i>	Not Assessed
61	Star gooseberry	Aru Nelli	<i>Cicca acida</i>	Not Assessed
62	Hispaniolan Rosy Trumpet Tree	Trumpet Tree	<i>Tabebuia berteroi</i>	Not Assessed
63	Ancole Fruit-Plant	Alinji maram	<i>Alangium lamarckii</i>	Not Assessed
64	Kara maram	Kara maram	<i>Kara maram</i>	Not Assessed
65	Kileri maram	Kileri maram	<i>Kileri maram</i>	Not Assessed
66	Eucalyptus	Nilgiri	<i>Eucalyptus tereticornis</i>	Not Assessed
67	Goose-Berry	Nelli	<i>Phyllanthus emblica</i>	Not Assessed
68	Flame of the Forest	Poovarasu, Porasu	<i>Butea monosperma</i>	Not Assessed
69	Indian Rosewood	Eetti Maram	<i>Dalbergia latifolia</i>	Vulnerable
70	Jacaranda	Jacaranda	<i>Jacaranda mimosaeifolis</i>	Not Assessed
71	Thuluppa Tree	Thuluppa Tree	<i>Thuluppa Tree</i>	Not Assessed
72	Jatropha	Kattavanik	<i>Jatropha glandulifera</i>	Not Assessed
73	Kahuva	Kahuva	<i>Kahuva</i>	Not Assessed
74	Lemon	Lemon	<i>Citrus limon</i>	Not Assessed
75	Macaranga	Vattakanni, Vattathamarei	<i>Macaranga peltata</i>	Not Assessed
76	Peranthalai maram	Peranthalai maram	<i>Peranthalai maram</i>	Not Assessed
77	Tree of Heaven	Perumaram	<i>Ailanthus excelsa</i>	Not Assessed
78	Areacnut	Kamugu, Pakku	<i>Areca catechu</i>	Not Assessed
79	Kassod tree	Ponnavarai maram	<i>Cassia siamea</i>	Not Assessed
80	Seema Karuvel	Seema Karuvel	<i>Seema Karuvel</i>	Not Assessed
81	Seema vadana maram	Seema vadana maram	<i>Seema vadana maram</i>	Not Assessed

S No	Common Name(English)	Vernacular Name(Tamil)	Botanical Name	IUCN Status
82	Vavini maram	Vavini maram	<i>Vavini maram</i>	Not Assessed
83	Vedasalam maram	Vedasalam maram	<i>Vedasalam maram</i>	Not Assessed
84	Jungle Tree	Vanamaram	<i>Vanamaram</i>	Not Assessed

### List of Top 10 Tree Species

S.No	Common Name(English)	Vernacular Name(Tamil)	Botanical Name	IUCN Status	No.of Trees
1	Tamrind	Puli	<i>Tamarindus indica</i>	Not Assessed	2290
2	Neem	Vembu	<i>Azadirachta indica</i>	Not Assessed	1429
3	Palm	Panei	<i>Borassus flabellifer</i>	Not Assessed	757
4	Dyers' oleander	Palamaram	<i>Wrightia tinctoria</i>	Not Assessed	423
5	Pongamia	Pungai	<i>Pongamia pinnata</i>	Least Concern	252
6	Coconut	Thengai	<i>Cocos nucifera</i>	Not Assessed	221
7	Indian Mulberry	Nona maram	<i>Morinda citrifolia</i>	Not Assessed	172
8	Gulmohar	Vadanaranyana	<i>Delonix regia</i>	Least Concern	153
9	Black Wattle	Oonzi	<i>Acacia mearnsii</i>	Not Assessed	141
10	Indian Elm	Aya maram	<i>Holoptelea integrifolia</i>	Not Assessed	137

### IUCN Categorization of Fauna Observed in the Forests along the Project Roads and Impact Areas

Name of the Species	IUCN Category
<b>I PHYLUM : ARTHROPODA</b>	
<b>A. CLASS : MYRIOPODA</b>	
1. <i>Centipede scolopendra</i>	This taxon has not yet been assessed for the IUCN Red List.
2. <i>Millipede spirostreptus</i>	This taxon has not yet been assessed for the IUCN Red List.
<b>B. CLASS : INSECTA</b>	
3. <i>Periplanata americana</i> (Cockroach)	This taxon has not yet been assessed for the IUCN Red List.
4. <i>Glossina domesticca</i> (Fly)	This taxon has not yet been assessed for the IUCN Red List.
5. <i>Musca domestica</i> (House Fly) Makki	This taxon has not yet been assessed for the IUCN Red List.
6. <i>Anabillus sp.</i> (Mosquito)	This taxon has not yet been assessed for the IUCN Red List.
<b>C. CLASS : ARACHINDA</b>	
1. <i>Palamaeus swammerdami</i> (Scorpion)	This taxon has not yet been assessed for the



Name of the Species	IUCN Category
	IUCN Red List.
<b>VERTEBRATE</b>	
<b>III PHYLUM CHORDATA</b>	
<b>I. AMPHIBIA</b>	
1. <i>Euphlyctis hexadactylus</i> (Indian Green Frog)	Least Concern
2. <i>Rana tigrina</i> (Indian bullfrog)	Least Concern
3. <i>Duttaphrynus melanostictus</i> (Black-spectacled Toad)	Least Concern
4. <i>Cacopus sp.</i>	This taxon has not yet been assessed for the IUCN Red List
<b>II. REPTILIA</b>	
5. <i>Sitana ponticeriana</i> (Fan Throated Lizard)	Least Concern
6. <i>Chameleon sp.</i> (Green Lizard)	This taxon has not yet been assessed for the IUCN Red List
7. <i>Calotes verticolour</i> (Garden Lizard)	This taxon has not yet been assessed for the IUCN Red List
8. <i>Testudo elegans</i> (Tortoise)	Lower Risk/least concern
<b>Sub Class : SNAKES</b>	
9. <i>Ophiophagus hannah</i> (King Cobra)	Vulnerable
10. <i>Vipera aspis</i> (Asp Viper)	Least Concern
11. <i>Dryophis sp.</i> (Eye Plucker)	This taxon has not yet been assessed for the IUCN Red List
12. <i>Bangarus sp.</i> (Krait)	This taxon has not yet been assessed for the IUCN Red List
13. <i>Echis carinata</i> (Little Indian viper)	This taxon has not yet been assessed for the IUCN Red List
<b>III. BIRDS</b>	
1. <i>Eudynamys scolopaceus</i> (Common Koel)	Least Concern
2. <i>Sarkidiornis melanotos</i> (Comb Duck)	Least Concern
3. <i>Milvus migrans</i> (Black Kite)	Least Concern
4. <i>Alcedo meninting</i> (Blue-eared Kingfisher)	Least Concern
5. <i>Passer domesticus</i> (House Sparrow)	Least Concern
6. <i>Corvus splendens</i> (House Crow)	Least Concern
7. <i>Psittaciformes sp.</i> (Parrot)	Least Concern
8. <i>Pavo cristatus</i> (Indian Peafowl)	Least Concern
<b>IV. MAMMALIA</b>	
1. <i>Suncus murinus</i> (House Shrew)	Least Concern
2. <i>Pteropus giganteus</i> (Indian Flying Fox)	Least Concern
3. <i>Macaca radiata</i> (Bonnet Macaque)	Least Concern
4. <i>Funambulus palmarum</i> (Common Palm Squirrel)	Least Concern
5. <i>Sus scrofa</i> (Wild Boar)	Least Concern
6. <i>Melursus ursinus</i> (Sloth Bear)	Vulnerable
7. <i>Lepus nigricollis</i> (Indian Hare)	Least Concern
8. <i>Canis aureus</i> (Jackal)	Least Concern

**Annexure 4.2. Chainage wise Details of Trees Proposed to be Cut for the Phase-I Roads under TNRSP II**  
**Tiruchengode to Paramathy Section of Road No. 2 (SH 86)**

Chainage (km)		Categorisation of Trees based on GBH																	
		<10 cm		10 - 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		180 - 210 cm		>210 cm	
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS
54+800	55+000	1	0	2	4	23	1	1	2	1	3	0	1	0	0	0	0	0	0
55+000	56+000	15	32	25	19	17	10	7	3	13	5	14	3	6	0	0	1	4	5
56+000	57+000	24	10	6	11	6	0	5	1	30	0	7	0	1	2	0	0	0	0
57+000	58+000	11	17	1	8	19	15	7	2	1	1	1	2	0	1	2	0	4	7
58+000	59+000	29	7	10	8	13	22	21	9	34	3	5	10	2	1	0	0	0	0
59+000	60+000	8	1	3	0	2	4	3	0	3	0	3	0	2	0	1	1	2	2
60+000	61+000	26	2	11	1	2	0	3	0	2	1	0	4	1	1	1	1	0	0
61+000	62+000	2	8	0	2	0	4	1	2	4	2	0	4	0	2	0	1	0	2
62+000	63+000	0	0	3	0	4	0	6	0	5	1	2	0	0	0	0	0	0	0
63+000	64+000	4	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2
64+000	65+000	3	2	0	4	6	1	0	0	2	1	1	1	0	0	0	0	0	4
65+000	66+000	0	11	0	11	0	12	0	2	0	0	0	0	0	1	0	0	0	3
66+000	67+000	8	1	0	1	0	0	0	0	0	1	0	2	0	4	0	0	2	1
67+000	68+000	26	13	2	3	0	2	1	0	5	1	6	0	7	2	4	4	6	5
68+000	69+000	46	20	8	5	17	4	20	5	23	5	5	3	1	2	1	0	1	1
69+000	70+000	20	5	2	5	5	6	6	10	18	12	20	14	10	7	3	1	2	1
70+000	71+000	27	19	1	5	6	3	4	2	15	1	0	1	0	0	2	0	3	6
71+000	72+000	16	20	5	4	1	7	2	5	15	16	3	3	0	2	0	0	0	1
72+000	73+000	29	1	5	0	1	3	1	1	3	4	4	2	2	0	1	0	2	1
73+000	74+000	45	25	8	3	8	1	4	1	4	2	0	2	1	0	0	0	1	1
74+000	75+000	19	14	4	0	6	0	3	3	4	1	2	3	5	0	3	0	1	3
75+000	76+000	67	27	2	2	2	6	1	1	4	1	3	3	3	7	4	4	10	12
76+000	77+000	13	18	4	4	1	3	0	2	0	2	3	0	2	0	1	0	8	9
77+000	78+000	5	1	2	0	1	2	1	0	1	1	2	2	8	1	2	1	11	13

Chainage (km)		Categorisation of Trees based on GBH																	
		<10 cm		10 - 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		180 - 210 cm		>210 cm	
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS
78+000	79+000	7	6	12	3	5	6	2	0	0	1	0	2	3	2	2	4	10	9
79+000	80+000	3	0	0	3	1	4	4	3	6	5	5	5	3	9	3	6	8	8
80+000	81+000	0	2	6	2	3	2	2	0	1	4	0	3	2	4	2	8	10	8
<b>Sub Total</b>		<b>454</b>	<b>262</b>	<b>123</b>	<b>108</b>	<b>149</b>	<b>118</b>	<b>105</b>	<b>54</b>	<b>196</b>	<b>74</b>	<b>88</b>	<b>70</b>	<b>59</b>	<b>48</b>	<b>32</b>	<b>32</b>	<b>85</b>	<b>104</b>
<b>Grand Total</b>																		<b>2161</b>	

#### Malliyakarai to Rasipuram Section of Road No. 4 (SH 79)

Chainage (km)		Categorisation of Trees based on GBH																	
		<10 cm		10 - 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		180 - 210 cm		>210 cm	
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS
0+000	1+000	0	1	1	3	4	13	4	10	10	2	2	1	5	0	3	1	14	16
1+000	2+000	0	0	0	0	3	0	1	1	1	2	0	1	1	1	0	0	6	9
2+000	3+000	0	0	0	0	4	0	5	1	13	1	11	0	5	0	12	0	11	3
3+000	4+000	0	0	1	0	14	0	1	1	6	6	11	7	11	7	6	5	3	7
4+000	5+000	0	0	4	0	3	2	2	5	2	2	0	2	0	0	1	1	7	6
5+000	6+000	3	0	1	0	2	0	2	1	4	1	0	1	0	3	0	4	6	15
6+000	7+000	0	0	0	0	7	0	2	2	3	5	4	2	2	3	2	2	19	23
7+000	8+000	0	0	1	3	0	4	0	2	2	0	1	0	0	0	0	0	1	4
8+000	9+000	2	0	0	1	13	0	13	0	23	0	11	0	4	0	1	1	1	0
9+000	10+000	0	1	0	19	0	3	1	0	2	0	1	2	2	0	7	4	4	7
10+000	11+000	0	2	0	1	19	25	7	3	3	0	1	0	0	3	3	3	10	20
11+000	12+000	0	0	1	0	6	0	4	1	0	0	1	0	3	1	1	0	30	15
12+000	13+000	0	0	1	1	1	0	0	1	3	3	4	6	5	4	3	4	30	11
13+000	14+000	0	0	0	0	0	0	2	1	1	3	4	7	7	7	6	9	38	37
14+000	15+000	0	0	0	0	1	3	0	0	3	5	5	2	5	7	7	7	21	22
15+000	16+000	0	0	2	0	4	1	1	2	1	7	7	12	6	10	6	11	12	20

Chainage (km)		Categorisation of Trees based on GBH																	
		<10 cm		10 - 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		180 - 210 cm		>210 cm	
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS
16+000	17+000	1	1	0	9	1	3	2	0	2	9	17	12	7	17	6	11	8	17
17+000	18+000	0	1	6	5	2	6	4	2	6	7	9	7	16	7	16	14	25	25
18+000	19+000	1	0	1	0	2	0	4	0	3	2	4	1	3	4	6	2	33	33
19+000	20+000	1	0	2	0	2	0	1	0	3	1	1	6	4	11	10	8	21	31
20+000	21+000	1	0	1	5	0	12	6	10	4	12	1	6	3	3	2	2	5	1
21+000	22+000	1	0	1	3	2	3	6	4	2	5	6	2	4	5	0	4	4	1
22+000	23+000	0	0	0	4	0	4	0	11	0	8	1	5	0	2	0	1	0	0
23+000	24+000	3	0	7	1	8	0	12	0	23	0	14	0	1	1	3	0	1	0
24+000	25+000	0	0	6	1	3	2	2	2	0	6	1	1	2	0	0	1	1	0
25+000	26+000	7	0	0	5	9	4	3	1	0	2	0	0	2	0	0	0	0	0
26+000	27+000	0	0	1	9	1	15	10	5	5	3	2	5	1	1	1	1	0	0
27+000	28+000	0	1	4	5	8	3	13	3	13	1	3	0	7	1	1	0	0	2
28+000	29+000	0	0	1	6	9	4	9	6	4	5	4	3	2	4	0	2	5	0
29+000	30+000	1	0	3	0	19	3	10	1	11	0	11	0	8	1	2	1	5	1
30+000	30+600	1	0	2	4	0	1	2	1	1	3	1	4	0	2	0	0	1	1
<b>Sub Total</b>		<b>22</b>	<b>7</b>	<b>47</b>	<b>85</b>	<b>147</b>	<b>111</b>	<b>129</b>	<b>77</b>	<b>154</b>	<b>101</b>	<b>138</b>	<b>95</b>	<b>116</b>	<b>105</b>	<b>105</b>	<b>99</b>	<b>322</b>	<b>327</b>
<b>Grand Total</b>																		<b>2187</b>	

**Rasipuram to Tiruchengode Section of Road No. 4 (SH 79)**

Existing Chainage in km		Categories of Trees based on GBH																		Total
		<10		10-30		30-60		60-90		90-120		120-150		150-180		180-210		>210		
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	
51+000	52+000	0	1	2	3	1	1	5	5	1	3	0	0	0	0	0	0	0	0	22
52+000	53+000	9	1	9	9	6	5	8	7	6	7	2	5	0	3	0	1	0	1	79
53+000	54+000	4	0	10	8	6	8	14	13	12	8	3	0	1	1	0	0	0	0	88
54+000	55+000	0	1	7	11	18	1	3	4	4	5	1	4	1	1	1	1	1	4	68
55+000	56+000	0	3	0	1	6	0	7	2	5	2	0	2	3	1	4	3	2	1	42

Existing Chainage in km		Catagories of Trees based on GBH																		Total
		<10		10-30		30-60		60-90		90-120		120-150		150-180		180-210		>210		
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	
56+000	57+000	0	11	13	6	8	7	9	4	5	16	1	0	0	1	0	1	2	0	84
57+000	58+000	22	1	15	12	10	36	8	7	40	2	31	2	7	0	0	0	1	1	195
58+000	59+000	5	0	4	7	15	0	0	1	3	0	2	0	0	0	0	0	0	0	37
59+000	60+000	1	15	5	13	7	5	3	3	1	2	1	3	1	0	0	0	2	0	62
60+000	61+000	7	10	6	6	5	1	1	2	0	8	3	2	1	3	1	1	0	3	60
61+000	62+000	12	3	8	11	11	3	4	2	44	6	20	2	4	1	3	0	1	0	135
62+000	63+000	20	1	15	2	9	2	6	1	12	9	6	4	1	1	1	0	1	1	92
63+000	64+000	8	0	2	0	3	1	1	0	0	2	1	1	0	1	1	0	5	2	28
64+000	65+000	5	2	3	5	5	1	9	2	4	5	2	2	1	0	1	0	3	1	51
65+000	66+000	22	17	10	4	2	0	4	0	6	6	3	0	1	1	0	1	1	1	79
66+000	67+000	3	8	5	10	1	6	8	1	11	5	1	0	0	0	0	0	0	0	59
67+000	68+000	13	12	6	11	20	18	11	8	13	12	3	6	2	2	0	2	0	0	139
68+000	69+000	7	12	4	9	22	13	13	9	13	5	12	4	3	1	0	0	1	0	128
69+000	70+000	12	16	6	18	10	11	12	11	21	12	6	3	2	2	1	0	0	0	143
70+000	71+000	7	0	1	3	1	2	14	9	24	22	3	0	3	1	0	0	0	1	91
71+000	72+000	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4
<b>Sub Total</b>		<b>158</b>	<b>114</b>	<b>131</b>	<b>150</b>	<b>167</b>	<b>122</b>	<b>140</b>	<b>91</b>	<b>225</b>	<b>137</b>	<b>101</b>	<b>40</b>	<b>31</b>	<b>20</b>	<b>13</b>	<b>10</b>	<b>20</b>	<b>16</b>	<b>1686</b>
<b>Trees Present along LHS</b>																				<b>986</b>
<b>Trees Present along RHS</b>																				<b>700</b>
<b>Grand Total</b>																				<b>1686</b>

**Mohanur to Namakkal Section of Road No. 5 (SH 95)**

Chainage (km)		Categorisation of Trees based on GBH																		Total
		<10 cm		10 - 30 cm		30 - 60 cm		60 - 90 cm		90 - 120 cm		120 - 150 cm		150 - 180 cm		180 - 210 cm		>210 cm		
		LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	LHS	RHS	
15+700	16+000	4	3	5	6	6	1	6	4	1	0	1	0	0	0	0	0	0	0	37
16+000	16+200	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
0+600	1+000	1	0	1	0	2	2	0	1	3	3	2	1	1	0	2	3	4	9	35
1+000	2+000	3	2	3	8	9	20	4	8	2	4	5	0	2	2	4	4	14	27	121
2+000	3+000	9	7	8	11	4	9	1	4	2	17	1	5	1	0	2	3	2	10	96
3+000	4+000	1	1	0	8	3	3	0	1	0	2	0	0	0	0	0	0	0	0	19
4+000	5+000	0	1	0	5	6	1	8	3	1	0	0	3	1	3	0	0	2	7	41
5+000	6+000	6	7	3	9	3	5	1	1	0	2	1	4	2	3	0	1	11	10	69
6+000	7+000	10	4	13	5	3	21	4	5	8	6	4	3	3	3	3	0	18	12	125
7+000	8+000	6	0	9	0	10	4	3	1	4	1	2	2	3	1	2	0	7	14	69
8+000	9+000	3	2	7	3	4	7	4	8	1	5	2	0	4	3	7	3	16	8	87
9+000	10+000	10	8	10	5	7	1	4	1	8	7	6	2	9	5	9	4	19	19	134
10+000	11+000	14	6	15	18	3	4	2	0	1	2	0	3	1	4	0	3	6	2	84
11+000	12+000	0	0	3	7	11	14	13	17	6	12	1	11	1	5	2	5	14	18	140
12+000	13+000	1	1	4	5	3	6	2	1	1	6	1	12	2	5	4	5	14	18	91
13+000	14+000	0	6	0	5	0	0	1	0	4	0	1	3	0	2	1	1	1	3	28
<b>Sub Total</b>		<b>68</b>	<b>49</b>	<b>81</b>	<b>95</b>	<b>74</b>	<b>98</b>	<b>54</b>	<b>55</b>	<b>42</b>	<b>67</b>	<b>27</b>	<b>49</b>	<b>30</b>	<b>36</b>	<b>36</b>	<b>32</b>	<b>128</b>	<b>157</b>	
<b>Trees Present along LHS</b>																				<b>540</b>
<b>Trees Present along RHS</b>																				<b>638</b>
<b>Grand Total</b>																				<b>1178</b>



**Annexure 5.1. Photos of Focus Group Discussion (FGD)**

**FGD Meeting for Corridor 2: Tiruchengode-Paramthy Road (SH 86)**



**FGD Meeting for Corridor 4: Malliyakarai – Rasipram – Thiruchengode Road (SH 79)**



**FGD Meeting for Corridor 5: Mohanur – Namakkal Road (SH 95)**





## Annexure 5.2. Photos of Public Consultation

### Public Consultation Meeting for Corridor 2: Tiruchengode to Paramthy Section of Omalur-Sankari-Tiruchengode-Paramathy Road (SH 86)



**Public Consultation Meeting for Corridor 4: Malliyakarai to Rasipuram Section of Malliyakarai-Rasipuram-Tiruchengode-Erode Road (SH 79)**



**Public Consultation Meeting for Corridor 4: Rasipuram to Tiruchengode Section of Malliyakarai-Rasipuram-Tiruchengode-Erode Road (SH 79)**








**Annexure 5.3. Filled Registration Form of Public Consultation conducted for Phase I Roads under TNRSP II**

**Public Consultation for Upgradation of Tiruchengode to Paramathy Section (km 54.800 to km 80.100) of SH 86 in the State of Tamil Nadu**

Place \_\_\_\_\_

Date 27.06.16.

S. No	Name & Address	Panchayat Name	Signature
	<p>மாணவன் சாலை                      9/0 கந்தசுப்பிரமணியம்,                      மூலமயலூர்                      மெலாண்டி</p>	<p>மூலமயலூர்                      மெலாண்டி                      கிராமம்.</p>	<p>                      27/06/2016                      மெலாண்டி.</p>
	<p>9443258989                      செல்லை.</p>	<p>கிராமம்                      மூலமயலூர் மெலாண்டி.</p>	<p>தலைவர்,                      மெலாண்டி.  </p>
	<p>T.R. நாகேசுவரன்                      சா. மெலாண்டி.                      மெலாண்டி மெலாண்டி</p>	<p>மெலாண்டி கிராமம்                      மெலாண்டி மெலாண்டி</p>	<p>தலைவர்,                      மெலாண்டி.  </p>



TNRSP

Upgradation of Corridor 2 - Thiruchengode - Paramathy road of SH86  
under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 2 – மா.நெ.86-இல் திருச்செங்கோடு – பரமத்தி சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : இராணி திருமண  
மண்டபம், கந்தம்பாளையம்

Date/ நாள் : 29/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
1	M. PONNUSAMY President Methyanaal	M.	புலவர்	9443258999	[Signature]
2	[Signature]	M.	வாணியம்	9865532777	[Signature]
3	R. சீரானந்தன்	M.	வாணியம்	9865450783	[Signature]
4	R. லக்ஷ்மணன்	M.	விவசாயம்	9443260216	[Signature]
5	[Signature]	M.	சாலை	9443701573	[Signature]
6	R. சீரானந்தன்	M.	வேலை	9486761270	[Signature]
7	A. Shanmuga Sudhan	M.	வாணியம்	944226024	[Signature]
8	V. பாலசுப்பிரமணியன்	M.	Retd. B.H.S.	9443578737	[Signature]
9	R. சிவசுப்பிரமணியன்	M.	சுத்தியம்	9095519650	[Signature]
10	T. Dhandapani	M.	Hotel	9942852146	[Signature]
11	S. சுவாமிநாதன்	M.	Cycle Shop	9373326923	[Signature]



TNRSP

Upgradation of Corridor 2 - Thiruchengode - Paramathy road of SH86  
under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 2 – மா.நெ.86-இல் திருச்செங்கோடு – பரமத்தி சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : இராணி திருமண  
மண்டபம், கந்தம்பாளையம்

Date/ நாள் : 29/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
12.	ச.சு.சுவாமிநாதர்	♂	Ret - BNS	9842552262	ச.சு.சுவாமிநாதர்
13.	P. Paravanan	Male	Burner	9842064656	P. Paravanan
14.	N. Gobinath.	male	Business	996532987	N. Gobinath.
15.	S. Krishnamoorthi	male	Business	996502622	S. Krishnamoorthi
16.	மா. சதாநாதர்	ஆண்	தொழிலாளர்	94431 58777	மா. சதாநாதர்
17.	பொன்னிஜயங்குண்டி	ஆண்	சிய தொழிலாளர்	97906 32775	பொன்னிஜயங்குண்டி
18.	P. சௌந்தர்	ஆண்	Business	9843636 122	P. சௌந்தர்
19.	K. சுவாமிநாதர்	ஆண்	தொழிலாளர்	984247 5681	K. சுவாமிநாதர்
20.	P. NANDAKUMAR	Male	தொழிலாளர்	95972 00030	P. NANDAKUMAR
21.	P. லாஜஸ்வரன்	ஆண்	தொழிலாளர்	94898 52276	P. லாஜஸ்வரன்
22.	மா.சு.சுவாமிநாதர்	ஆண்	பி.என்.என்.சி.	99652 87043	மா.சு.சுவாமிநாதர்

23. K. Saravanan. Male Business 94428 64546

24. P.G. Raju Pathy Male Business 9443953999

25. R. RAMASAMY MALE Retiree 9442640784

26) S. Musthafa - ஆண் - Business 9442147155. R.S. Rd.





TNRSP

Upgradation of Corridor 2 - Thiruchengode - Paramathy road of SH86 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 2 – மா.நெ.86-இல் திருச்செங்கோடு – பரமத்தி சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : இராணி திருமண

Date/ நாள் : 29/04/14

மண்டபம், கந்தம்பாளையம்

Time/ நேரம் : காலை 11.00 மணி

Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
1	V. சிவசுப்பிரமணியன் 4/306 கவுண்டிமேன் ந.கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	9443059265	[Signature]
2	T. சத்யசூரியன் 4/196, அலையன்சு N. கந்தம்பாளையம்	ஆண்	LTC Agent	9443551940	T. Sathya Suresh
3	R. சிவசுப்பிரமணியன் 4/64E M.கந்தம்பாளையம்	ஆண்	Retired hort. officer	9444136864	[Signature]
4	R. சிவசுப்பிரமணியன் 1/167 அலையன்சு N. கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	94867 65588	[Signature]
5	A. சிவசுப்பிரமணியன் 76 ஆன் டிரைவ் N. கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	94431 60248	[Signature]
6	K. சிவசுப்பிரமணியன் 1/200 அலையன்சு N. கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	9489785643	[Signature]
7	T. சத்யசூரியன் அலையன்சு N. கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	944882248	[Signature]
8	S. சிவசுப்பிரமணியன் S/o. சிவசுப்பிரமணியன் N. கந்தம்பாளையம்	ஆண்	உழைப்பாளர்	9842587747	[Signature]





TNRSP

Upgradation of Corridor 2 - Thiruchengode - Paramathy road of SH86  
under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 2 – மா.நெ.86-இல் திருச்செங்கோடு – பரமத்தி சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : இராணி திருமண  
மண்டபம், கந்தம்பாளையம்

Date/ நாள் : 29/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
9	P. மணியன் 1/33 மென்மேல்	ஆண்	சுயதொழில்	9159564448 9159564448	P. Maniyan
10	P. மலையாளம் 1/437 கந்தம்பாளையம்	ஆண்	சுயதொழில்	9442216080	Praveen
11	M. சண்முகம் 5/05 கந்தம்பாளையம் 1/214	ஆண்	252-வாஸ்	9443380555	M. Sankar
12	சென்னை Soman	ஆண்	சுயதொழில்	9442732629	Soman
13	S. சந்திரமணி 50 கந்தம்பாளையம்	ஆண்	சுயதொழில்	9944013938	S. Chandramani
14	தி. சந்திரமணி சென்னை	ஆண்	சுயதொழில்	944272125	T. Chandramani
15	S. சந்திரமணி சென்னை	ஆண்	சுயதொழில்	750293068	S. Chandramani
16	S. சந்திரமணி சென்னை	ஆண்	சுயதொழில்		S. Chandramani
17	P. G. Praveen	Male	Lath maker	944395399	P. G. Praveen
18	R. RAMASAMY Uthiyapalayam	Male	Rtd JE	9442640789	R. Ramasamy
19	S. Muthusamy	Male	Rtd - R.S.	924424715	S. Muthusamy



TNRSP

Upgradation of Corridor 2 - Thiruchengode - Paramathy road of SH86  
under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 2 – மா.நெ.86-இல் திருச்செங்கோடு – பரமத்தி சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : இராணி திருமண  
மண்டபம், கந்தம்பாளையம்

Date/ நாள் : 29/04/14

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Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
	P. சிவசுந்தர்	ஆண்	ஆண்	994283842	P. சிவசுந்தர்
	V. சிவசுந்தர்	ஆண்	ஆண்	9788799478	V. சிவசுந்தர்
	Amutha Kumar	ஆண்	ஆண்		Amutha Kumar
	P. Nalawathi	ஆண்	ஆண்	9750880	P. Nalawathi
	K. P. Sankar	ஆண்	ஆண்	9486785833	K. P. Sankar
	N. P. Sankar	ஆண்	ஆண்	9442114469	N. P. Sankar
	மணிசூர்	ஆண்	ஆண்	9443164600	மணிசூர்
	நாடுபுலி	ஆண்	ஆண்		
	R. Sankar	ஆண்	ஆண்	9443565585	R. Sankar
	N. Alagarajar	ஆண்	ஆண்	9443139305	
	K. Ramakrishna	ஆண்	ஆண்	9787923069	







Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப  
பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female/ ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
1.	V. Asokan	male	உலவசாயம்	9786317889	V. Asokan
2.	P. Laxtha; oil plant	ஆண்	உலவசாயம்	9443104190	
3.	M. Mariyamal		உலவசாயம்	9442667391	
4.	M. Periasamy 2/40, Mangalapuram (P.O)	Male	உலவசாயம்	902698834	M. Periasamy
5	உலவசாயம் மங்களாபுரம்	ஆண்	உலவசாயம்	9655369245	உலவசாயம்
6	ம. சசுரணன்		சில்லி கடை	9629636305	ம. சசுரணன்
7	B. Nagaraj Mangalapuram			9991836193	B. Nagaraj
8	உலவசாயம்		உலவசாயம்	97872376	உலவசாயம்
9	உலவசாயம்			978648	உலவசாயம்
10	உலவசாயம்		உலவசாயம்	9688053712	உலவசாயம்

11 R. Laxman

TNEB - 9944506345



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03  
தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03  
திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM  
சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப  
பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
12	C. Raju மங்களாபுரம்.	ஆண்	உதவியாளர்	9965696409	C. Raju
13	J. Srinivasan மங்களாபுரம்.	ஆண்	தொழிலாளர்	9787123796	J. Srinivasan
14	T. Srinivasan மங்களாபுரம்.	ஆண்	பெண்	975198047	T. Srinivasan
15	R. Srinivasan மங்களாபுரம்.	ஆண்	பெண்	9688944846	R. Srinivasan
16	A. Thilagaraj மங்களாபுரம்.	ஆண்	Blood Lab.	9943557392	A. Thilagaraj
17	G. Prabu மங்களாபுரம்.	ஆண்	லேபர்	9047619152	G. Prabu
18	M. Srinivasan மங்களாபுரம்.	ஆண்	பெண்	9626333485	M. Srinivasan
19	M. Srinivasan மங்களாபுரம்.	ஆண்	labour	-	M. Srinivasan
20	R. Srinivasan மங்களாபுரம்.	ஆண்	பெண்	962606037	R. Srinivasan
21	M. Srinivasan மங்களாபுரம்.	ஆண்	பெண்	9786893820	M. Srinivasan



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
22	K.S.mani kandan mangalapuram	m	mechonic	9865189108	K.S. Mani Kandan
23	S.P. Revathi Mangalapuram	F	Teacher	9751183198	S.P. Revathi
24	C.B. Mani Mangalapuram	M.	—	9826777121	C.B. Mani
25	P.A. Aruchelvan mangalapuram	m	Agric.	9842406118	P.A. Aruchelvan
26	சிறீகிருஷ்ணன் மல்லியக்கரை		உலர்.		சிறீகிருஷ்ணன்
27	M. Arun Kumar Mangalapuram	M	ஆக்டிவ்	94439 - 00091	M. Arun Kumar
28	G. Venkatesh E.M. Palayam	M	Agric	98848 - 58752	G. Venkatesh
29	செல்வகுமார் மல்லியக்கரை	m	உலர்	944269 3481	செல்வகுமார்
30	Subramaniam mellitakero	m.	Agric		
31	M. Arun Kumar	M	ER	94428 50435	M. Arun Kumar
32	R. Sivan	M	ER	94428 70440	R. Sivan





TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்துதல் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
33	K. BAKHARAN. Near by G.H.S school mangalapuram	male	stall -	9487201643	K. Bakharan
34	A. Jayaraju mangalapuram	male	Rtd.Hm	04287- 245295	A. Jayaraju
35	Ramchandran Eshamathur pi	male	Labour.	978796- 8160	Ramchandran
36	A. Prabhakar. mangalapuram	male	Agri cult.	9943274253	A. Prabhakar
37	v. Jeyaraj mangalapuram	male	sale	9489805152	v. Jeyaraj
38	P. Jeyaraj	Male		8300131386	P. Jeyaraj
39	K.C. Gopalan	Male	Malligai merchant	8056955291	K.C. Gopalan
40	D. Gopalan	Male	Labour	894049049	D. Gopalan
41	T. Tamilkani E. Palayam.	male	Agri cult.	915946830	T. Tamilkani
42	K. Bakharan E. Palayam	male	Agri cult.	97865046 35	K. Bakharan
43	M. Jeyaraj			978149016	M. Jeyaraj



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
44	Sadaiappan Somanapaki mangalapuram. po Rasiipuram. Vaynakkal (T)	Male	Labour.	9943258295	[Signature]
45	K. B. Sroojini Devi Anipalsyam.	Female	—	7639228891	K.B. Sroojini Devi
46	N. Loganathan Eshwaramoorthy	M	labour	9786125505	N. Loganathan
47	R. Hathi E.M. Parthasarathy	M	உழைப்பு	9787965307	R. Hathi
48	R. Ramakrishna Mangalapuram	M	உழைப்பு	9965454311	R. Ramakrishna
49	A. N. S. E.M. Parthasarathy	M	உழைப்பு	9843973110	A. N. S.
50	Ackappan Eshwaramoorthy	M	Agriculture		அழகப்பன்
51	Muthuswamy mangalapuram	M	rentless	936445012	[Signature]
52	V. Jaganath mangalapuram	M	Agri	948669088	V. Jaganath
53	K. Srinivasan	M	முனைவர்	9600396866	K. Srinivasan
54	P. Srinivasan		திட்டமிடல்		[Signature]



TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
55	செல்வநாயகம் மல்லியக்கரை	ஆண்	உயர்	7810988223	செல்வநாயகம்
56	மயான்குடி	ஆண்	உயர்	948724926	செல்வநாயகம்
57	மயான்குடி	ஆண்	உயர்	958558920	செல்வநாயகம்
58	மயான்குடி	ஆண்	உயர்	729925454	செல்வநாயகம்
59	மயான்குடி	ஆண்	உயர்	9751180836	செல்வநாயகம்
60	மயான்குடி	ஆண்	உயர்	9786817998	செல்வநாயகம்
61	மயான்குடி	ஆண்	உயர்	904753333	செல்வநாயகம்
62	மயான்குடி	ஆண்	உயர்	708815840	செல்வநாயகம்
63	மயான்குடி	ஆண்	உயர்	9843960744	செல்வநாயகம்
64	மயான்குடி	ஆண்	உயர்	8146324381	செல்வநாயகம்
65	மயான்குடி	ஆண்	உயர்	9629252322	செல்வநாயகம்



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
66	A. துரைசாமிநாயகர் மங்களாபுரம்	m	தொழிலாளர்	8144411082 9524002325	[Signature]
67	[Handwritten Name]	வயல்	[Handwritten Occupation]	—	[Signature]
68	[Handwritten Name]	வயல்	[Handwritten Occupation]	—	[Signature]
69	M. கருணாநிதி பாண்டிச்சேரி	ஆண்	பொருளியல்	98426 51393	[Signature]
70	K. விஸ்வநாதன் பாண்டிச்சேரி	ஆண்	பொருளியல்	91505 56772	[Signature]
71	[Handwritten Name]	ஆண்	[Handwritten Occupation]	94113094017	[Signature]
72	[Handwritten Name]	ஆண்	[Handwritten Occupation]	9487220 420	[Signature]
73	[Handwritten Name]	ஆண்	[Handwritten Occupation]	9443058221	[Signature]
74	[Handwritten Name]	ஆண்	[Handwritten Occupation]	934222220	[Signature]
75	[Handwritten Name]	ஆண்	[Handwritten Occupation]	9486408231	[Signature]
76	[Handwritten Name]	ஆண்	[Handwritten Occupation]	—	[Signature]



TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : பஞ்சாயத்து யூனியன் ஆரம்ப  
பள்ளி, மங்களாபுரம்

Date/ நாள் : 30/04/14

Time/ நேரம் : காலை 11.00 மணி

Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
	M. Shannuyyees	male	Business	9447555265	[Signature]
	S. Eswaran	male	Agric	9585655589	S. Eswaran
	A. Rajesha	male	Maer.	9863509349	A. Rajesha



TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14

Time/ நேரம் : மாலை 3.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
1	V. Dhayalan வெங்கடசாலை சாலை	M	இடம்	9711520411	
2	S. S. S. S. S. செல்வன்	m	வாணிகர்	977858 31227	செல்வன்
3	செல்வன் செல்வன்	M	வாணிகர்	9526448894	
4	N. K. K. K. K. நகேசன் கேசன்	m	நாயர்	9442231 399	நகேசன்
5	சுப்பன் சுப்பன்	m.	வாணிகர்	97157278 74	m.m. சுப்பன்
6	V. S. S. S. S. V. S. S. S. S.	M.	Business.	9944588881	v.s.s.
7	செல்வன் செல்வன்	m	வாணிகர்	9788	57647
8	R. M. S. S. S. ரமணி	m	mangar	78780 58789	
9	P. K. K. K. K. பகவதன்	m	Agriculture	94444	



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14  
Time/ நேரம் : மாலை 3.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
10	செல்வாசாமி நல்லியக்கரை கொண்டை	M	விவசாயம்	9715218903	[Signature]
11	S. K. செக்கிங்குடார் கொண்டை மாரியம் சதுக்கம்	M	விவசாயம்	9360328543	[Signature]
12	V. A. Raghavapur Vairappapalayam	M	.	233501	V.A. Raghavapur
13	S. SELVAM S. LAKSHMIPALAYAM	M	Teacher	909566 2042	S. Selvam
14	R. K. Sivar கையப்பமலை	M	மென்சாலை	9976668426	R. K. Sivar
15	N. சிவசுப்பிரமணியன் கையப்பமலை	M	விவசாயம்	74023396	[Signature]
16	V. Raghavapur கையப்பமலை	M	.	கையப்பமலை	[Signature]
17	V. Raghavapur கையப்பமலை	M	விவசாயம்	9842146632	V. Raghavapur
18	P. Palaniappan கையப்பமலை	M	விவசாயம்	9842731167	P. Palaniappan
19	V. Raghavapur கையப்பமலை	M	தொழில்	8883582719	V. Raghavapur
20	N. Raghavapur கையப்பமலை	M	விவசாயம்	8098491388	[Signature]





Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14

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21	P.சுமரன் மாதுவாழ்வரம்	ஆண்	மாதுவாழ்வரம்	9688241856	P.சுமரன்
22	S. Gurusamy	ஆண்	விவசாயம்	989446988	Gurusamy
23	P.அவதாயி	ஆண்	மாதுவாழ்வரம்	—	P.அவதாயி
24	R. Soektharvan	ஆண்	விவசாயம்	9443420907	
25	R. சண்முகம்	ஆண்	மாதுவாழ்வரம்		
26	R. சண்முகம்	ஆண்	விவசாயம்	9047069488	R. சண்முகம்
27	N.S. அனாபதி	ஆண்	மாதுவாழ்வரம்	944223264	N.S. அனாபதி
28	G. ராஜா	ஆண்	Printing Press Cyber mart	9443708877	G. ராஜா
29	R. சண்முகம்	ஆண்	மாதுவாழ்வரம்	9442231888	R. சண்முகம்
30	A. ராஜா	ஆண்	மாதுவாழ்வரம்	9750876833	A. ராஜா
31	C. சண்முகம்	ஆண்	மாதுவாழ்வரம்	816419242	C. சண்முகம்

செலிபெலியம்









TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14

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Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
43	மா. குமார்	ஆண்	உயர்நிலைப்பள்ளி ஆசிரியர்	9688941584	மா. குமார்
44	சு. நயினார்	ஆண்	கூலி	9942304131	சு. நயினார்
45	M. சந்திரசேகர்	ஆண்	வியாபாரி	9780236296	M. சந்திரசேகர்
46	சு. சி. சி.	ஆண்	கூலி	—	சு. சி. சி.
47	சு. சி. சி.	ஆண்	உயர்நிலைப்பள்ளி ஆசிரியர்	9443223638	சு. சி. சி.
48	சு. சி. சி.	ஆண்	உயர்நிலைப்பள்ளி ஆசிரியர்	9442925864	சு. சி. சி.
49	J. சி. சி.	ஆண்	பிரிண்டர்	9443575531	J. சி. சி.
50	R. ஜெயசீமா	Female	நிர்வாகி	9443708878	R. ஜெயசீமா
51	M. A. ரமணி	Female	கம்பைரர்	9443374046	M. A. ரமணி
52	சு. சி. சி.	ஆண்	கூலி	9788013697	சு. சி. சி.
53	E. S. சி. சி.	ஆண்	உயர்நிலைப்பள்ளி ஆசிரியர்	9443303483	E. S. சி. சி.



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14  
Time/ நேரம் : மாலை 3.00 மணி

Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
54	P.Selvam	ஆண்	வியாபாரம்	9578397171	P.Selvam
55	Jin	ஆண்	பிடிவாரி	—	Jin
56	K.S. Sankar	ஆண்	பிடிவாரி	—	K.S. Sankar
57	M.C. Ganesh	ஆண்	வியாபாரம்	9942330754	M.C. Ganesh
58	<del>செ. ப. சண்முகம்</del>	ஆண்	வியாபாரம்	—	செ. ப. சண்முகம்
59	S.P. Sankaranarayanan	ஆண்	வியாபாரம்	—	S.P. Sankaranarayanan
60	P. Rajasekan	ஆண்	Business	—	P. Rajasekan
61	Rajasekan	ஆண்	Business	—	Rajasekan
62	L. H. Sankaranarayanan	ஆண்	வியாபாரம்	—	L. H. Sankaranarayanan
63	M. S. Prasadani	ஆண்	வியாபாரம்	—	M. S. Prasadani



TNRSP

Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14  
Time/ நேரம் : மாலை 3.00 மணி

Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
64	M. Thangaraj	ஆண்		9578108188	M. Thangaraj
65	V. G. S. Srinivasan (S. No. 2)	ஆண்		042882503	V. G. S. Srinivasan
66	T. S. Srinivasan	ஆண்	உரிமையாளர்	9942666877	T. S. Srinivasan
67	R. Srinivasan	ஆண்	புத்தக வியாபாரி	8675791375	R. Srinivasan
68	M. Srinivasan	ஆண்	கடை	9787537561	M. Srinivasan
69	S. Srinivasan	ஆண்	கடை	9649952083	S. Srinivasan
70	S. Srinivasan	ஆண்	கடை	9894966952	S. Srinivasan
71	R. Srinivasan	ஆண்	கடை	985058572	R. Srinivasan
72	M. S. Srinivasan	ஆண்	கடை	—	M. S. Srinivasan
73	S. Srinivasan	ஆண்	கடை	7299172122	S. Srinivasan
74	G. Srinivasan	ஆண்	கடை	9443374969	G. Srinivasan



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03

தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03

திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM

சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்கள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14  
Time/ நேரம் : மாலை 3.00 மணி

Sl. No/ வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
75	சுப்பு சிவசுந்தரன்	m	Self	97150296	Self
76	K.R. Ramesh Koppampatty	m	Labour	8526720871	K.R. Ramesh
77	Kandhan Koppampatty	m	Labour		
78	சுப்பு சிவசுந்தரன்	M.	Self	9751270788	Self
79	Vaigyanamali	m	Lic Oper	9442996622	Self
80	Theravel Koppampatty	m	Labour		Theravel
81	S. KANAGIASAPATHY Elachipalayam	M	worsh impot Com em.	94421-94317	Self
82	K.A. RAJAN Elachipalayam	M	Rtd. Teacher	94435-23590	Self
83	R. Duraisamy Elachipalayam	M	Associate	94425-84040	Self
84	R. Boopathur President Minnampall.	M.	Agri	737307733 964302868	Self
85	சுப்பு சிவசுந்தரன்	M	Labour	9025181264	Self



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of  
SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03  
தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03  
திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM  
சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண  
மண்டபம், வையப்பமலை

Date/ நாள் : 30/04/14  
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Sl. No/வ.எண்.	Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
86	K.v. Theodor	ஆண்	உயரணம்	04288233723	K.v. Theodor
87	M. Theodor	ஆண்	"	04288233206	M. Theodor
88	S. Puyaseli	ஆண்	உயரணம்	9443173671	S. Puyaseli
89	S. Balakrishnan	ஆண்	உயரணம்	9788623728	S. Balakrishnan
90	B. Tamil selvi	பெண்			B. Tamil selvi
91	muthusamy Nallanganni	m	Business	900854500	muthusamy
92	mk. muthusamy Eelchipalay	m	Business	99424217	mk. muthusamy
93	Rameswamy Thiruvengadam	m	Business		Rameswamy
94	S. Pankaj	ஆண்	உயரணம்	9865560516	S. Pankaj
95	P. Sankar	ஆண்	உயரணம்	9849999375	P. Sankar
96	tenkaiyandi	ஆண்	உயரணம்	9443161129	tenkaiyandi



Upgradation of Corridor 4 – Malliyakkarai - Thiruchengode road of SH79 under Tamil Nadu Road Sector Project II (TNRSP II) – PPC03  
தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03  
திட்டச் சாலை 4 – மா.நெ.79 -இல் மல்லியக்கரை - திருச்செங்கோடு சாலை மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM  
சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்

பதிவுத் தாள்

Venue/இடம் : லஷ்மி திருமண மண்டபம், வையப்பமலை

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Sl. No/ வ.எண்.	Name & Address/ & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
97	M. Kumaresan.	male	Agri	9095222736	M. Kumaresan
98	S. Gnanamani	ஆண்	Business	934466005	S. Gnanamani
99	S. Ananthan	ஆண்	Business	9869537625	S. Ananthan
100	N. Damodaran	ஆண்	Business	9442231915	N. Damodaran
101	T. Vinithkumar	Male	Bus driver	9443251760	T. Vinithkumar
102	R. Lakshmi	ஆண்	Business	9443515758	R. Lakshmi
103	K. Prabhakaran	"	Business	9442070082	K. Prabhakaran
104	S. Rajkumar	ஆண்	Business	9944489770	S. Rajkumar
105	M. Kamasany	ஆண்	Business	9047023392	M. Kamasany
106	A. Ananthan	ஆண்	Business	9500868434	A. Ananthan
107	N. Ananthan	ஆண்	Business	9500084548	N. Ananthan

	<u>Name</u>	Male/ Female	Occupat	Phn	SM
108	P. Ramesh Raj Elchhipu	m	Business	9788592724	E. J. N. N. N.
109	K. Ganeshamonthi V. malai	m	Business	8883950596	K. S. S. S.
110	S. muthubharathi Elchhipu	m	Business	9944489070	S. S. S. S.
111	P. Divyashree S. Narayanaiah		SM	9965229739	P. S. S. S.
112	m. s. k. s. k. s. Nellampalay.	m	Business	9598360979	K. M. M. M.
113	mohan Nellampalay.	m	labour	986945594	C. N. N. N.
114	Rajin Nellam	m	Agri.	9443389329	P. R. R. R.
115	Shenmuyham Chinnemalappay	m	Agri.	9443333726	M. G. G. G.
116	Seethasivam Vijayapalai	m	Business	9865987800	S. S. S. S.
117	Theraja Raj Vijayapalai	m	Business	9842716490	S. S. S. S.
118	Dharmaraj Elchhipalayam	m	Business	9865552789	V. D. D. D.



பெயர்	பாலினம்	பணி	தொலைபேசி	கையொப்பம்
செல்வம்	ஆண்	வணிகம்	9688453703	[Signature]
P. சந்திரசேகரன்	ஆண்	வணிகம்	9949933501	[Signature]
K. சந்திரசேகரன்	ஆண்	வணிகம்	9842718734	[Signature]
S. சந்திரசேகரன்	ஆண்	வணிகம்	9788013440	[Signature]
K. சந்திரசேகரன்	ஆண்	வணிகம்		[Signature]
P. சந்திரசேகரன்	ஆண்	வணிகம்		[Signature]
A. சந்திரசேகரன்	ஆண்	வணிகம்	9788881338	[Signature]
V. M. சந்திரசேகரன்	ஆண்	வணிகம்	9976115398	[Signature]
R. சந்திரசேகரன்	ஆண்	வணிகம்		[Signature]
S. Senthil	male	Business	7373083311	[Signature]
R. Rajendran	Male	Business	9047050570	[Signature]
K. Sathish	male	Business	9842607119	[Signature]
K. Kandasamy	male	Business	9715078163	[Signature]
L. Lingesan	female	Business	9842661932	[Signature]
[Signature]	ஆண்	வணிகம்	9949933501	[Signature]
[Signature]	ஆண்	வணிகம்	9047009815	[Signature]





Upgradation of Corridor 5 - Mohanur - Namakkal road of SH95 under  
Tamil Nadu Road Sector Project II (TNRSP II) – PPC03  
தமிழ்நாடு சாலை மேம்பாட்டுத் திட்டம் II - PPC03  
திட்டச் சாலை 5 – மா.நெ.95 -இல் மோகனூர் - நாமக்கல் சாலை  
மேம்படுத்தும் பணி

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION - REGISTRATION FORM  
சுற்றுச் சூழல் மற்றும் சமூக தாக்கத்திற்கான பொதுமக்கள் கலந்தாலோசனைக் கூட்டம்  
பதிவுத் தாள்

Venue/இடம் : நாவலடியான் திருமண  
மண்டபம், மோகனூர்

Date/ நாள் : 01/05/14  
Time/ நேரம் : காலை 11.00 மணி

No/ வ.எண்.	Sl. Name & Address/ பெயர் & முகவரி	Male/ Female ஆண்/ பெண்	Occupation /தொழில்	Phone number /தொலைபேசி எண்.	Signature/ கையொப்பம்
1	R. சிங்கராஜ்	ஆண்	வழங்கியர்	9965334844	R. சிங்கராஜ்
2	செல்வன்	ஆண்	கூலி	-	செல்வன்
3	செல்வன்	ஆண்	கூலி	-	செல்வன்
4	R. சேஷமணி	ஆண்	கூலி	9750293699	A. சேஷமணி
5	P. சிவசுப்பிரமணியன்	ஆண்	கூலி	8508891945	P. சிவசுப்பிரமணியன்
6	K. சுவாமி	ஆண்	கூலி	9488546697	K. சுவாமி
7	செல்வன்	ஆண்	கூலி	-	செல்வன்
8	K. சிவசுப்பிரமணியன்	ஆண்	கூலி	9442507670	K. சிவசுப்பிரமணியன்
9	M. P. சேஷமணி	ஆண்	கூலி	9443286662	M. P. சேஷமணி
10	செல்வன்	ஆண்	கூலி	9443356108	செல்வன்
11	K. O. U. சேஷமணி	ஆண்	கூலி	9486340715	K. O. U. சேஷமணி



Upgradation of Corridor 5 - Mohanur - Namakkal road of SH95 under  
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12	செல்வாட்சன்	ஆண்	1, 28 2008 2008	9443427395	
13	சுபிரதீபன்	11	கூலி	8754670082	சுபிரதீபன்
14	சுபிரதீபன்	11	கூலி	7373886824	
15	சுபிரதீபன்	11	கூலி	9622999786	சுபிரதீபன்
16	சுபிரதீபன்	11	கூலி	9626528820	சுபிரதீபன்
17	சுபிரதீபன்	11	கூலி	8675807317	சுபிரதீபன்
18	சுபிரதீபன்	11	கூலி	9047496807	சுபிரதீபன்
19	சுபிரதீபன்	11	கூலி		
20	K. சுவாமிநாதன் சுபிரதீபன்	ஆண்	கூலி	962941621	K. சுவாமிநாதன்
21	சுபிரதீபன்	11	கூலி	9442697857	சுபிரதீபன்
22	சுபிரதீபன்	11	கூலி		சுபிரதீபன்



Upgradation of Corridor 5 - Mohanur - Namakkal road of SH95 under  
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23.	V.S. சிதம்பரம்	ஆண்	ஆய்வாளர்	9677911622	
24.	R.V.P. சாமசாமி	ஆண்	ஆய்வாளர்	9566637927	
25.	Mr. சிவசாமி	ஆண்	ஹார்டி 2 மதுரை	9865015257	
26.	K. Harishan.	ஆண்	செய்தலாளர் செய்தலாளர்	9344257700	
27.	K. Somu			9842057774	
28.	S. Jaganath.	ஆண்	ஆய்வாளர்	9865652878	
29.	P. சரஸ்வதி	ஆண்	ஆய்வாளர்	9944066196	
30.	K. Renuka	ஆண்	ஆய்வாளர்	9842022225	
31.	செய்தலாளர்	ஆண்	ஆய்வாளர்	9360237202	
32.	L. சிவசாமி	ஆண்	ஆய்வாளர்	9865015257	
33.	P. Murali	ஆண்	ஆய்வாளர்	9524716926	



Upgradation of Corridor 5 - Mohanur - Namakkal road of SH95 under  
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மேம்படுத்தும் பணி

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34.	T. RAMACHANDRAN	ஆண்	புலவர்	9842877581	T. Ramachandran
35	S. பார்த்தசாரதி	ஆண்	குட்டுவர்	9842556900	S. Parthasarathy
36.	P.K. Manojan	"	ஆய்வாளர்	9500247117	P.K. Manojan
37	PS சிவசுப்பிரமணியன்	"	ஆய்வாளர்	94421 55396	PS Sivaprasanna
38	சுப்பிரமணியன்	"	கொண்டி	95977528 13	Subramanian
39.	N. Ramesh	"	ஆய்வாளர்	9941681029	N. Ramesh
40	R. சத்யநாதன்	"	ஆய்வாளர்	9787772662	R. Sathyanathan
41	J. CHANDRAN	"	கொண்டி	94433 55265	J. Chandran
42	S. Pushpanjay	"	கொண்டி	944333 9272	S. Pushpanjay
43	Ramesh	"	கொண்டி		Ramesh
44	Ramesh	"	கொண்டி		Ramesh

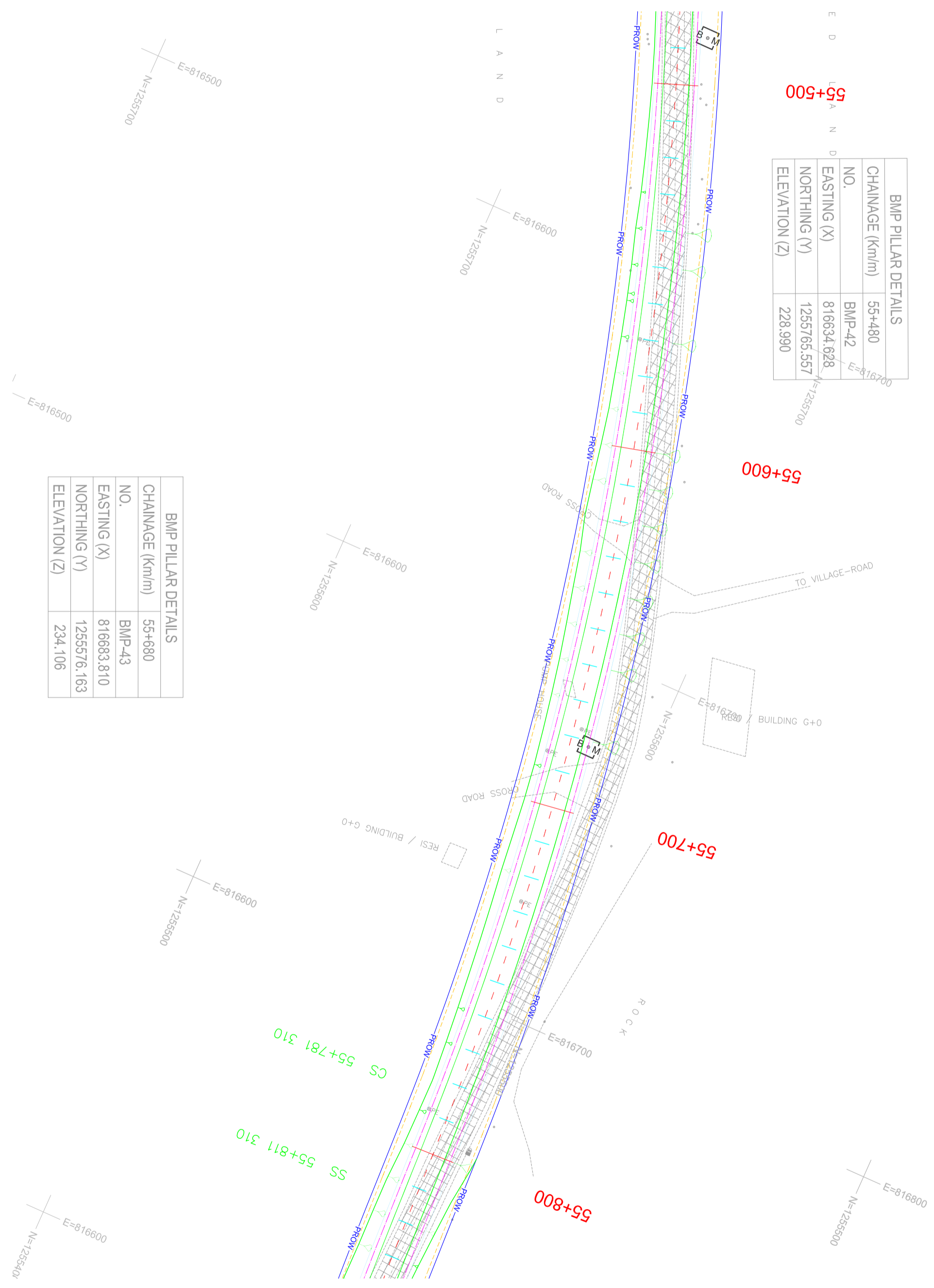


**Annexure 6.1. Drawings of Realignment Locations Proposed for Corridor 2:  
Tiruchengode – Paramathy Road (SH 86)**



BMP PILLAR DETAILS		
CHAINAGE (km/m)	55+480	
NO.	BMP-42	
EASTING (X)	816634.628	
NORTHING (Y)	1255765.557	
ELEVATION (Z)	228.990	

BMP PILLAR DETAILS		
CHAINAGE (km/m)	55+680	
NO.	BMP-43	
EASTING (X)	816683.810	
NORTHING (Y)	1255576.163	
ELEVATION (Z)	234.106	



Legend Proposed (Prop)	
	EX-CENTRELINE
	EX-CARRIAGEWAY
	EX-PAVED SHOULDER
	EX-EARTH SHOULDER
	EX-UTILITY CORRIDOR
	EX-PROPOSED RIGHT OF WAY
	EX-FOOTPATH
	EX-FOOTPATH DRAIN
	EX-CURVE POINT

Legend Existing	
	EX-CENTRELINE
	EX-CARRIAGEWAY
	EX-SHOULDER
	EX-STRUCTURE
	EX-BRIDGE
	EX-CULVERT

NOTE:	
1. ALL DIMENSION ARE IN METERS UNLESS OTHERWISE SPECIFIED.	

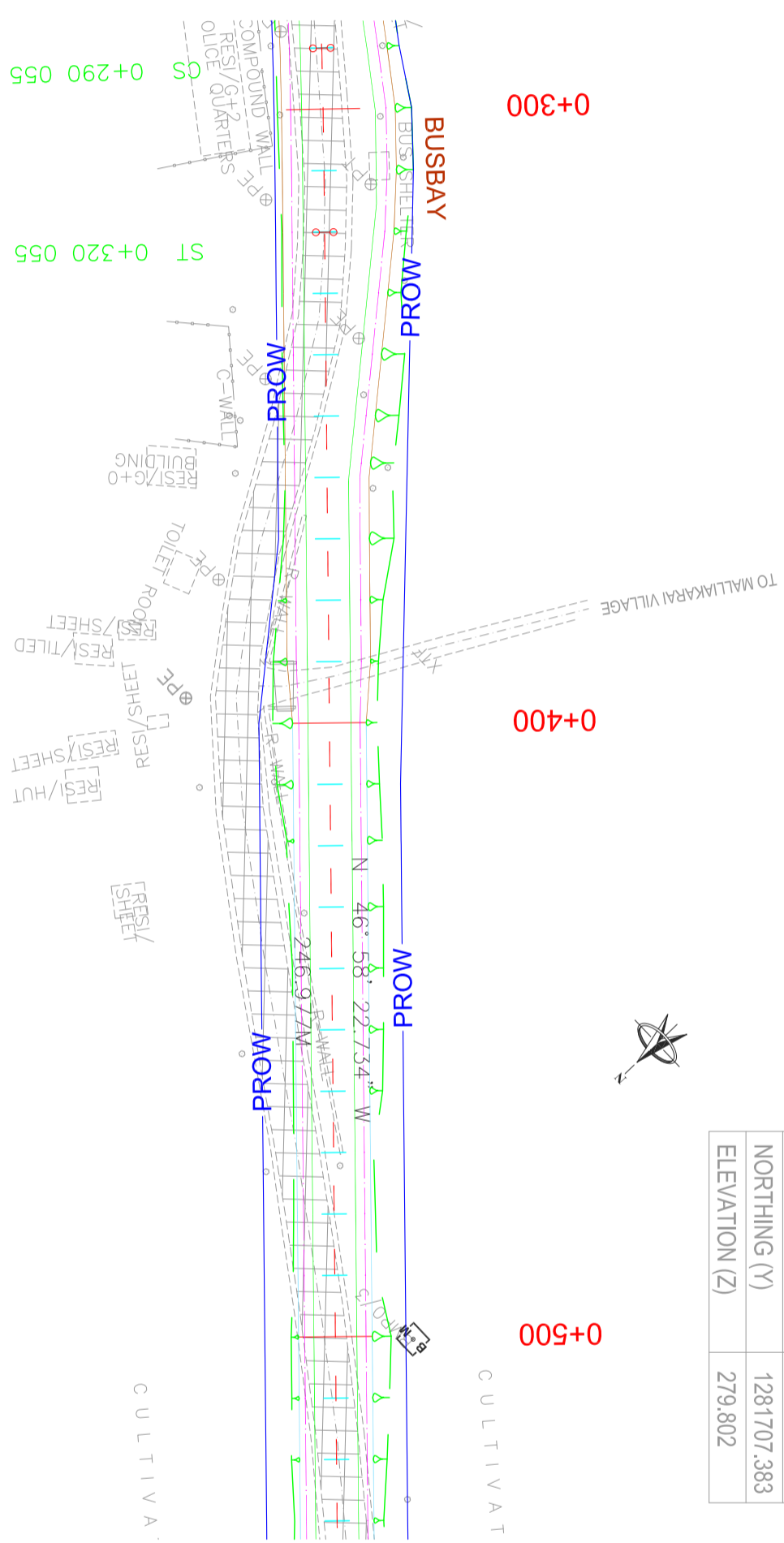
Client  
 TAMILNADU ROAD SECTOR PROJECT  
 Consultant  
 GDM SMITH INDIA PVT LTD  
 (Formerly Wilbur Smith Associates Pvt Ltd.)

Revision	
1	APRIL 2014 SUBMITTED FOR DRAFT CONCEPT REPORT

Project	
Date	APRIL-2014
Project Title	PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNSR II - PRC03
Project No.	1314044
Drawing No.	TNSRSP II-1-P-21-002
Sheet No.	1 OF 1
Rev.	PPR

**Annexure 6.2. Drawings of Realignment Locations Proposed for Corridor 4:  
Malliyakarai – Erode Road (SH 79)**

BM PILLAR DETAILS	
CHAINAGE (Km/m)	0+500
NO.	BMP0/3
EASTING (X)	881260.661
NORTHING (Y)	1281707.383
ELEVATION (Z)	279.802



Legend Proposed (Plan)-	
	CENTRE LINE
	CARRIAGEWAY
	PAVED SHOULDER
	EARTHEN SHOULDER
	UTILITY CORRIDOR
	PROPOSED RIGHT OF WAY
	OPEN DRAIN
	CURVE POINT
86.0	

Legend Existing-	
	EX-CENTRELINE
	EX-CARRIAGEWAY
	EX-SHOULDER LINE
	EX-STRUCTURE
	EXISTING BRIDGE
	EXISTING CULVERT

Legend Existing-	
	KILOMETRE STONE
	BENCH MARK PILLAR
	GPS PILLAR
	TELEPHONE POLE
	ELECTRIC POLE
	OPTIC FIBRE CABLE
	TREE
	SIGN BOARD

NOTES:  
1. ALL DIMENSION ARE IN METTER UNLESS OTHERWISE SPECIFIED.

Client	
TAMILNADU ROAD SECTOR PROJECT	
CDM SMITH INDIA PVT LTD (Formerly Wilbur Smith Associates Pvt Ltd.)	

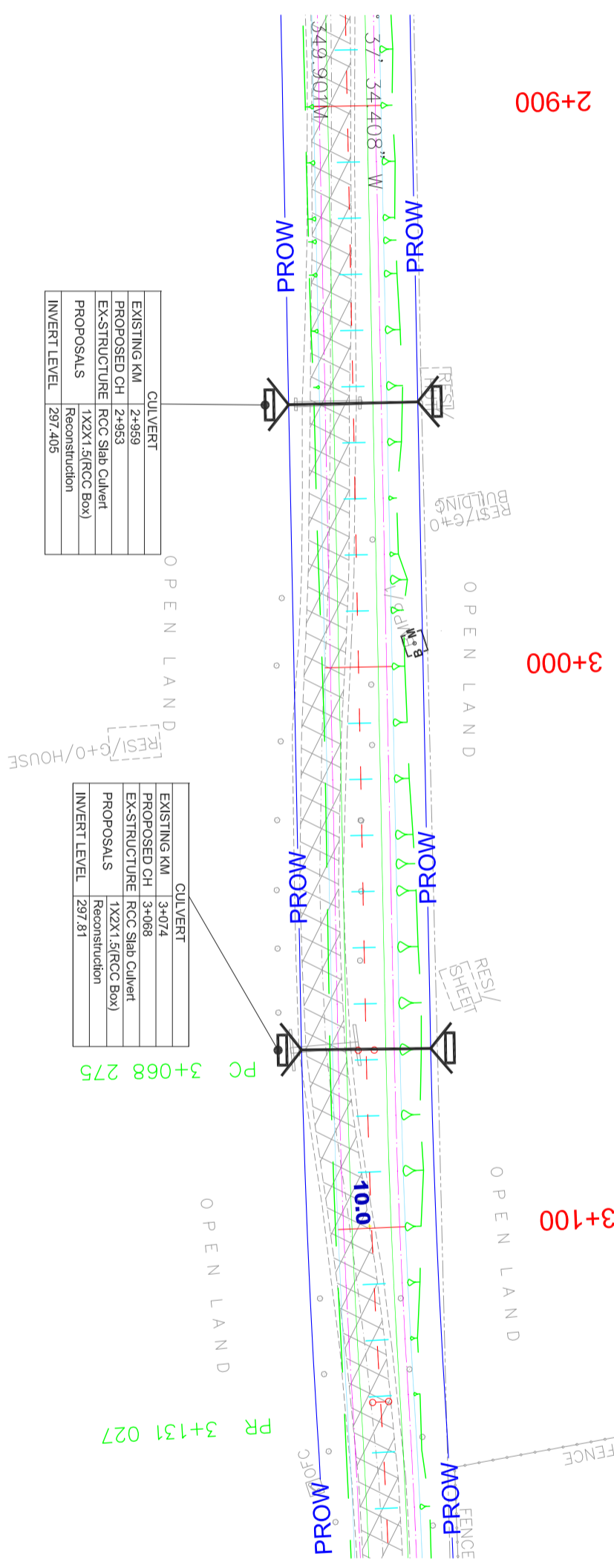
Project	
PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PC03	
CORRIDOR-04 REALIGNMENT PLAN MALLIKARAJI-ERODE (SH-79) FROM CH : 0+320 TO 0+500	

Revision	
Date	Scale
Design: SVA	Scale Horizontal:
Drawn: BAB	Scale Vertical:
Checked: VSG	Scale @ A0:
Approved: SRN	Scale @ A2:
	N.T.S

Drawing Title	
Date:	Project No.:
MAY - 2014	1314044
	Drawing No.:
	TNRSP-II-P-21-004/1
	Sheet No.:
	1 OF 5
	Rev.:
	PPR

BM PILLAR DETAILS	
CHAINAGE (Km/m)	3+000
NO.	BMP3/1
EASTING (X)	878912.958
NORTHING (Y)	1282367.869
ELEVATION (Z)	298.195

Horizontal Curve Details	
Curve Number	10
HP Challenge	3+098.651
Easting	878817.003
Northing	1282408.216
Deflection Angle	Z 23 48.027°
Radius	-1500.0m
Leading Ls	0m
Trailing Ls	0m
Tangent Length	31.381
Curve Length	62.752m
External Ordinal	0.328m
e%	NC
V length	80



CULVERT	
EXISTING KM	2+495
PROPOSED CH	2+495
EX-STRUCTURE	RCC Slab Culvert
PROPOSALS	12X1 (SRCC Box)
INVERT LEVEL	297.405

CULVERT	
EXISTING KM	3+074
PROPOSED CH	3+068
EX-STRUCTURE	RCC Slab Culvert
PROPOSALS	12X1 (SRCC Box)
INVERT LEVEL	297.81

Legend Proposed (Plan)-	
+	CENTRE LINE
—	CARRIAGEWAY
—	PAVED SHOULDER
—	EARTHEN SHOULDER
—	UTILITY CORRIDOR
—	PROPOSED RIGHT OF WAY
—	OPEN DRAIN
—	FURROW DRAIN
—	CURVE POINT

Legend Existing-	
—	EK-CENTRELINE
—	EK-COMPOUND/FENCE LINE
—	EK-ROW
—	EK-SHOULDER LINE
—	EK-CARRIAGEWAY
—	STRUCTURE
—	EXISTING BRIDGE
—	EXISTING CULVERT

Legend Proposed (Profile)-	
—	KILOMETRE STONE
—	BENCH MARK PILLAR
—	GPS PILLAR
—	TELEPHONE POLE
—	ELECTRIC POLE
—	OPTIC FIBRE CABLE
—	TREE
—	SIGN BOARD

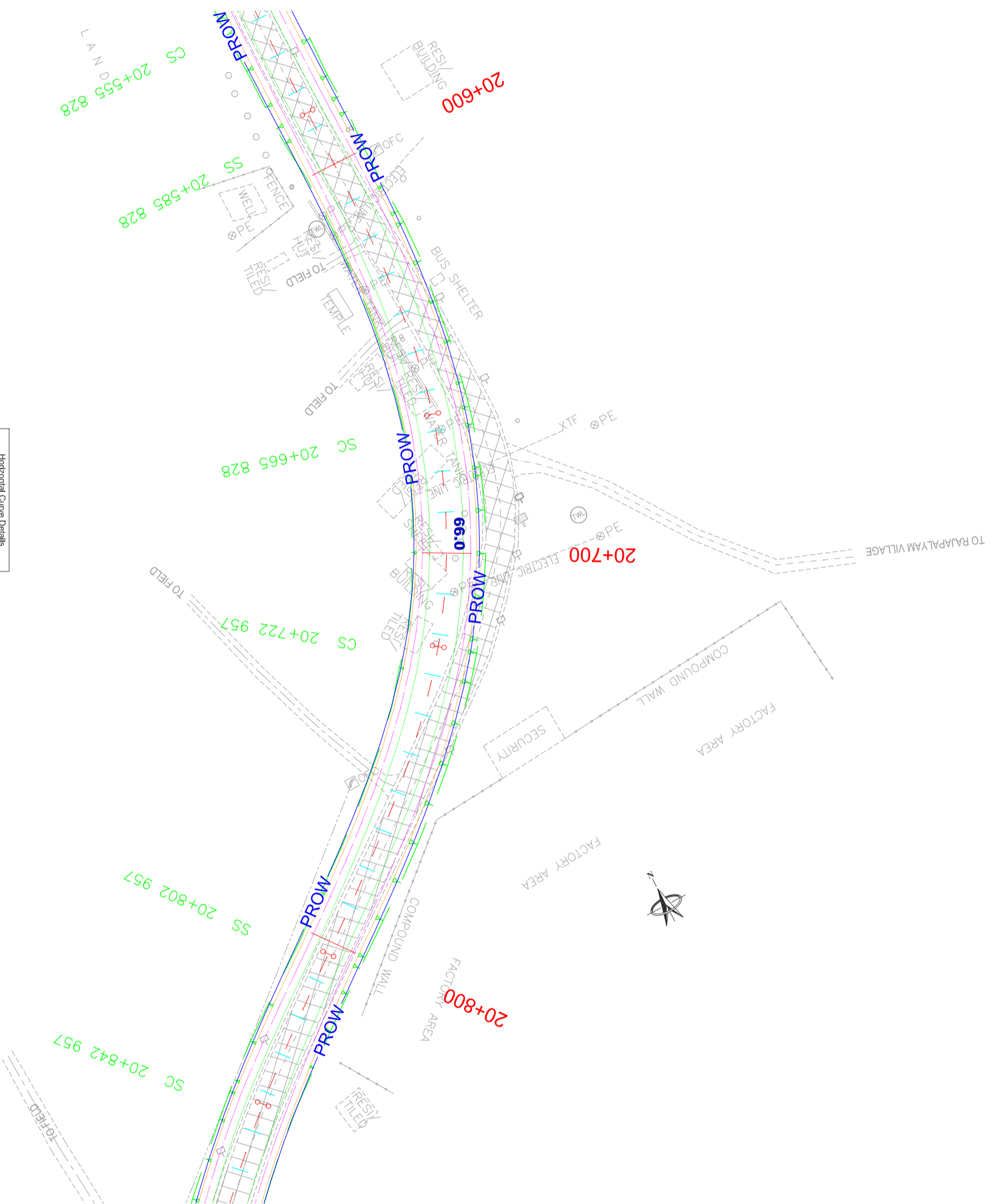
NOTE:-  
1. ALL DIMENSION ARE IN METTER UNLESS OTHERWISE SPECIFIED.

Client  
TAMILNADU ROAD SECTOR PROJECT  
Consultant  
Inrsi  
CDM SMITH INDIA PVT.LTD  
(Formerly Wilbur Smith Associates Pvt Ltd.)

Date	Designated	Scale @ A0
2014	SRA	N.T.S
2014	BAB	N.T.S
2014	USG	N.T.S
2014	SRN	N.T.S

Project  
PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PFC03  
Drawing Title  
CORRIDOR-04 REALIGNMENT PLAN  
MALLIKARAJI-ERODE (SH-79)  
FROM CH : 2+900 TO 3+130  
Date: MAY - 2014  
Project No: 1314044  
Drawing No: TNRSP-II-P-21-004/1  
Sheet No: 2 OF 5  
Rev: PPR





Horizontal Curve Details	
Curve Number	66
HP Challenge	20+694.393
Easting	865256.183
Northing	1275428.422
Deflection Angle	21.48° 17.487'
Radius	150.0m
Leadoff Ls	80m
Trailing Ls	80m
Tangent Length	28.915
Curve Length	57.125m
External Ordinate	2.761m
e%	7
V kmph	65

Legend Proposed (Faint)-	
	CENTRE LINE
	CARRIAGEWAY
	PAVED SHOULDER
	EARTHED SHOULDER
	UTILITY CORRIDOR
	PROPOSED RIGHT OF WAY
	OPEN DRAIN
	FUTURE DRAIN
	CURVE POINT

Legend Existing-	
	EX-CENTRELINE
	EX-COMPOUND/FENCE LINE
	EX-CARRIAGEWAY
	EX-SHOULDER LINE
	EX-CARRIAGEWAY STRUCTURE
	EXISTING BRIDGE
	EXISTING CULVERT

FURNISHING SYMBOLS	
	KILOMETRE STONE
	BENCH MARK PILLAR
	GPS PILLAR
	TELEPHONE POLE
	ELECTRIC POLE
	OPTIC FIBRE CABLE
	TREE
	SIGN BOARD

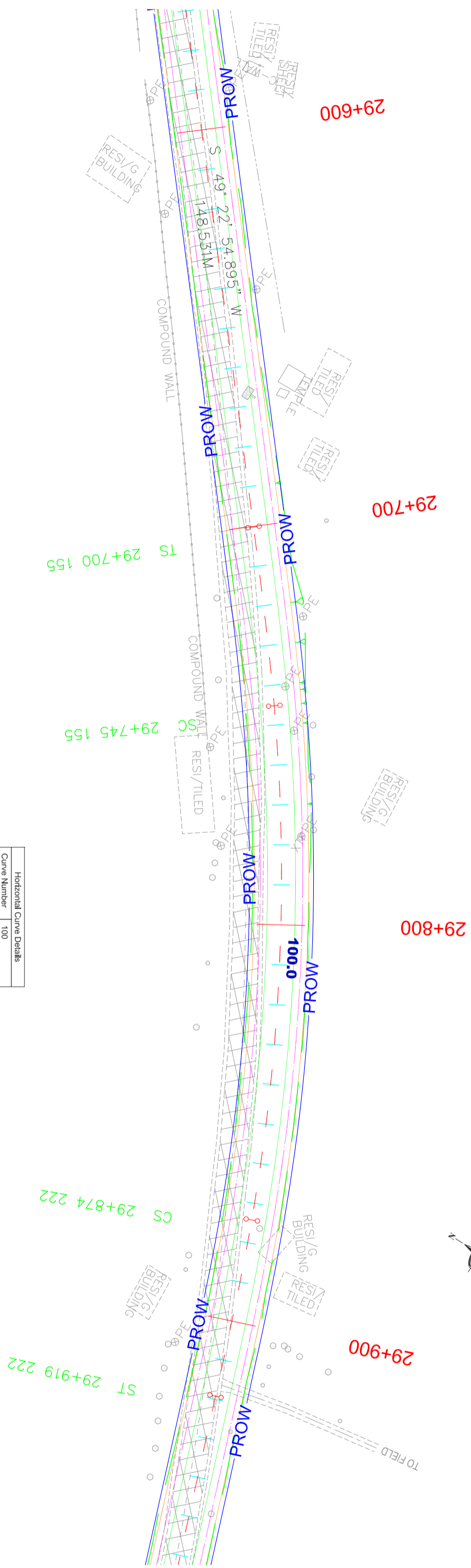
NOTES:  
1. ALL DIMENSION ARE IN METTER UNLESS OTHERWISE SPECIFIED.

Client  
**TAMILNADU ROAD SECTOR PROJECT**

Consultant  
**G.M. Smith**  
(Formerly Wilbur Smith Associates Pvt Ltd.)

Date		Revision	
Design:	SRB		
Drawn:	BAB		
Checked:	NSG		
Approved:	SRB		

Project		Drawing Title	
PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNSRP II - PPC03		CORRIDOR-04 REALIGNMENT PLAN	
MALLIKARAJI/ERODE (SH-79)		MALLIKARAJI/ERODE (SH-79)	
FROM CH : 20+600 TO 20+800		FROM CH : 20+600 TO 20+800	
Date:	MAY - 2014	Project No.:	1314044
		Drawing No.:	TNSRP-II-P-2-I-004/1
		Sheet No.:	4 OF 5
		Rev.:	PRR



Horizontal Curve Details	
Curve Number	100
HP Chainage	29+809.689
Easting	658981.287
Northing	1289375.173
Deflection Angle	19° 56' 47.778"
Radius	500.0m
Leading Ls	45m
Trailing Ls	45m
Tangent Length	110.451
Curve Length	120.057m
External Ordinate	7.445m
e%	6.8%
V (kmph)	80

Legend Proposed (Faint):

- Centre Line
- CARRIAGEWAY
- PAVED SHOULDER
- EARTHEN SHOULDER
- UTILITY CORRIDOR
- PROPOSED RIGHT OF WAY
- PERMANENT DRAIN
- CURVE POINT

Legend Existing:

- EX-CENTRELINE
- EX-COMPOUND/FENCE LINE
- EX-ROW
- EX-SHOULDER LINE
- EX-CARRIAGEWAY
- STRUCTURE
- EXISTING BRIDGE
- EXISTING CULVERT

Legend:

- PIRLONG STONE
- KILOMETRE STONE
- BENCH MARK PILLAR
- GPS PILLAR
- TELEPHONE POLE
- ELECTRIC POLE
- OPTIC FIBRE CABLE
- TREE
- SIGN BOARD

NOTE:  
1. ALL DIMENSION ARE IN METTER UNLESS OTHERWISE SPECIFIED.

Client: **TAMILNADU ROAD SECTOR PROJECT**

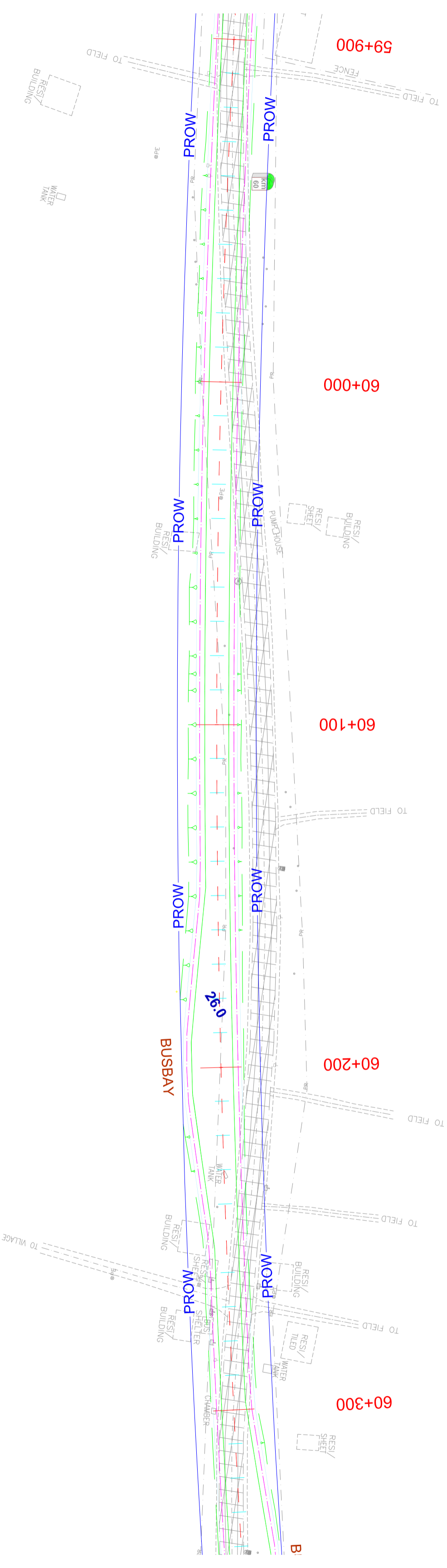
Consultant: **CDM SMITH INDIA PVT.LTD**  
(Formerly Wilbur Smith Associates Pvt Ltd.)

Date	Revision

Project: **PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSIP II - PFC03**

Drawing Title: **CORRIDOR-04 REALIGNMENT PLAN MALLIYAKARAI/ERODE (SH-79) FROM CH : 29+600 TO 29+930**

Date: MAY - 2014 | Project No: 1314044 | Drawing No: TNRSPII-P-21-004/1 | Sheet No: 5 OF 5 | Rev: PPR



Horizontal Curve Details	
Curve Number	26
HIP Chainage	60+177.856
Easting	831955.311
Northing	1261401.031
Deflection Angle	9° 4' 39.522"
Radius	-4000.0m
Leading Ls	0m
Trailing Ls	0m
Tangent Length	315.778
Curve Length	630.249m
External Ordinate	12.445m
e%	NC
V kmph	100

**Legend Proposed (Plan):-**

- CENTRE LINE
- CARRIAGEWAY
- PAVED SHOULDER
- EARTHEN SHOULDER
- UTILITY CORRIDOR
- PROPOSED RIGHT OF WAY
- OPEN DRAIN
- FURNISHING DRAIN
- CURVE POINT

**Legend Existing:-**

- EX-CENTRELINE
- EX-COMPOUND/FENCE LINE
- EX-ROW
- EX-SHOULDER LINE
- EX-CARRIAGEWAY
- STRUCTURE
- EXISTING BRIDGE
- EXISTING CULVERT

**Legend Proposed (Profile):-**

- KILOMETRE STONE
- BENCH MARK PILLAR
- GPS PILLAR
- TELEPHONE POLE
- ELECTRIC POLE
- OPTIC FIBRE CABLE
- TREE
- SIGN BOARD

**NOTE:-**  
1. ALL DIMENSION ARE IN METER UNLESS OTHERWISE SPECIFIED.

<p>Client: <b>TAMILNADU ROAD SECTOR PROJECT</b></p> <p>Consultant: <b>CDM SMITH INDIA PVT LTD</b> (Formerly Wilbur Smith Associates Pvt Ltd.)</p>		<p>Project: <b>PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PC03</b></p> <p>Drawing Title: <b>CORRIDOR-04 REALIGNMENT LOCATION MALLIYAKARAI-ERODE (SH-79) FROM CH : 59+900 TO 60+300</b></p>																											
<p>Horizontal Curve Details</p> <table border="1"> <tr><td>Curve Number</td><td>26</td></tr> <tr><td>HIP Chainage</td><td>60+177.856</td></tr> <tr><td>Easting</td><td>831955.311</td></tr> <tr><td>Northing</td><td>1261401.031</td></tr> <tr><td>Deflection Angle</td><td>9° 4' 39.522"</td></tr> <tr><td>Radius</td><td>-4000.0m</td></tr> <tr><td>Leading Ls</td><td>0m</td></tr> <tr><td>Trailing Ls</td><td>0m</td></tr> <tr><td>Tangent Length</td><td>315.778</td></tr> <tr><td>Curve Length</td><td>630.249m</td></tr> <tr><td>External Ordinate</td><td>12.445m</td></tr> <tr><td>e%</td><td>NC</td></tr> <tr><td>V kmph</td><td>100</td></tr> </table>	Curve Number	26	HIP Chainage	60+177.856	Easting	831955.311	Northing	1261401.031	Deflection Angle	9° 4' 39.522"	Radius	-4000.0m	Leading Ls	0m	Trailing Ls	0m	Tangent Length	315.778	Curve Length	630.249m	External Ordinate	12.445m	e%	NC	V kmph	100	<p>Designated: <b>SR</b></p> <p>Drawn: <b>BA</b></p> <p>Checked: <b>VS</b></p> <p>Approved: <b>SR</b></p>	<p>Date: <b>MAY-2014</b></p> <p>Scale @ AD: <b>N.T.S</b></p> <p>Scale @ AZ: <b>N.T.S</b></p>	<p>Date: <b>MAY - 2014</b></p> <p>Project No: <b>1314044</b></p> <p>Drawing No: <b>TNRSP-II-P-21-004/2</b></p> <p>Sheet No: <b>2 OF 3</b></p> <p>Rev: <b>PPR</b></p>
Curve Number	26																												
HIP Chainage	60+177.856																												
Easting	831955.311																												
Northing	1261401.031																												
Deflection Angle	9° 4' 39.522"																												
Radius	-4000.0m																												
Leading Ls	0m																												
Trailing Ls	0m																												
Tangent Length	315.778																												
Curve Length	630.249m																												
External Ordinate	12.445m																												
e%	NC																												
V kmph	100																												



Legend Proposed (Plan):-

	CENTRE LINE
	CARRIAGEWAY
	PAVED SHOULDER
	EARTHEN SHOULDER
	UTILITY CORRIDOR
	PROPOSED RIGHT OF WAY
	PROPOSED DRAIN
	EXISTING DRAIN
	CURVE POINT

Legend Existing:-

	EX-CENTRELINE
	EX-CARRIAGEWAY
	EX-SHOULDER
	EX-STRUCTURE
	EXISTING BRIDGE
	EXISTING CULVERT

Legend Existing:-

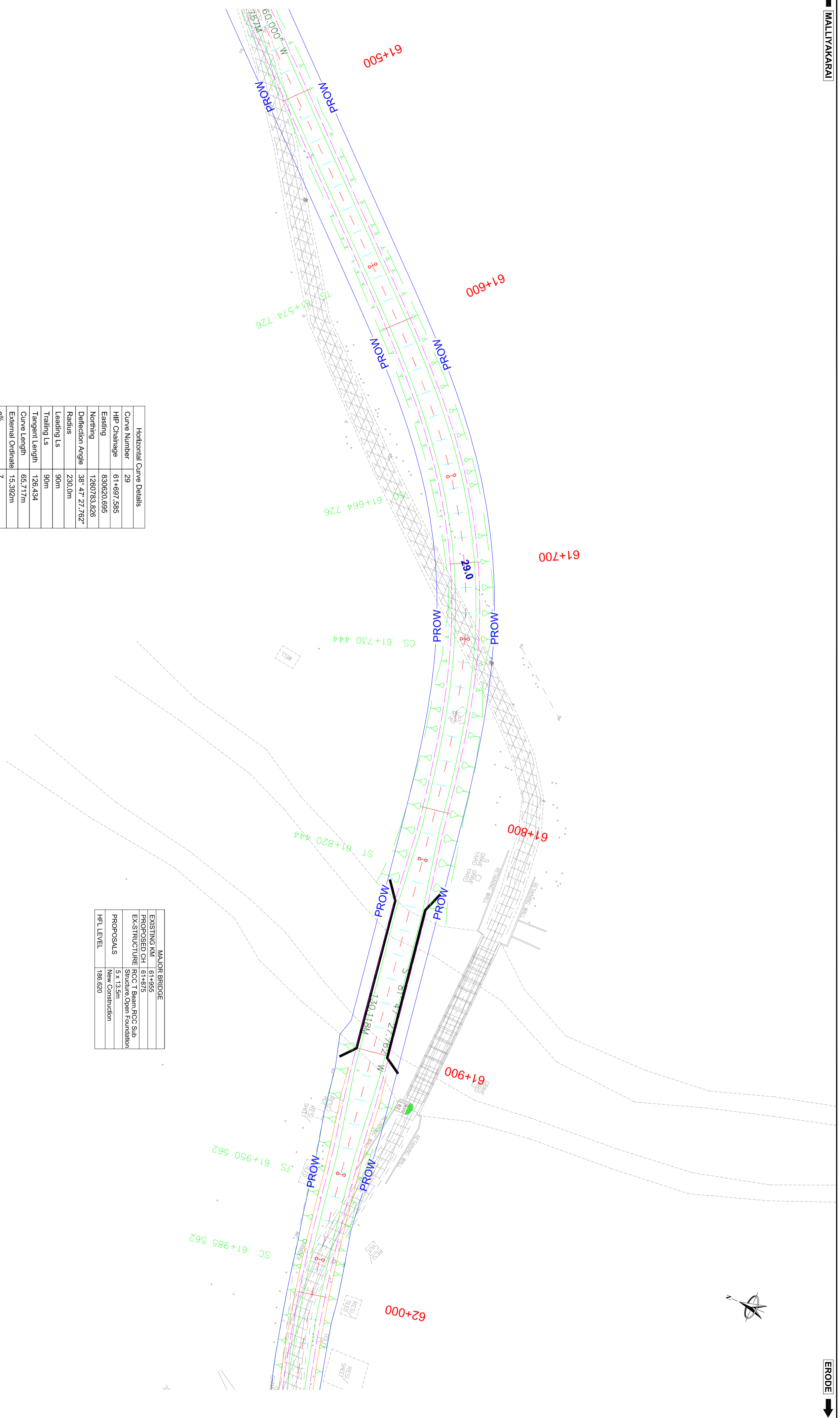
	KILOMETRE STONE
	BENCH MARK PILLAR
	TELEPHONE POLE
	ELECTRIC POLE
	OPTIC FIBRE CABLE
	TREE
	SIGN BOARD

NOTES:  
1. ALL DIMENSION ARE IN METER UNLESS OTHERWISE SPECIFIED.

Horizontal Curve Details	
Curve Number	29
HIP Chaiage	61+697.585
Easting	830620.695
Northing	1260783.826
Deflection Angle	38° 47' 27.762"
Radius	230.0m
Leading Ls	90m
Trailing Ls	90m
Tangent Length	126.434
Curve Length	65.717m
External Ordinate	15.392m
e%	7
V kmph	80

Client		TAMILNADU ROAD SECTOR PROJECT	
Consultant		CDM SMITH INDIA PVT.LTD (Formerly Wilbur Smith Associates Pvt Ltd.)	
Project		CORRIDOR-04 REALIGNMENT LOCATION MALLIYAKARAL-ERODE (SH-79) FROM CH : 61+100 TO 62+000	
Drawing Title		PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PFC03	
Date	14/05/2014	Scale @ AD:	N.T.S
Designated:	SRV	Scale @ AZ:	N.T.S
Drawn:	BAB	Project No.	1314044
Checked:	USG	Drawing No.	TNRSP-II-P-21-004/2
Approved:	SRN	Sheet No.	3 OF 3
Revision		Rev.	
		PRR	

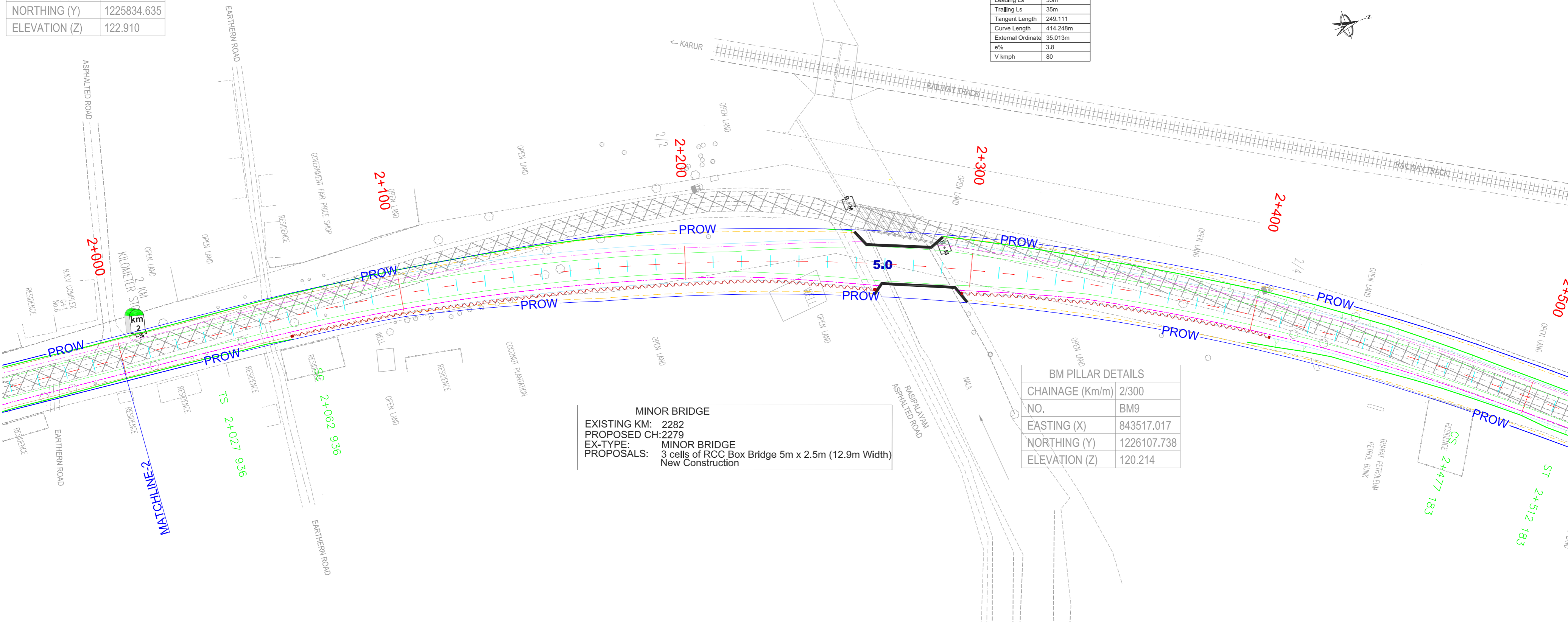
MAJOR BRIDGE	
EXISTING KM	61+955
PROPOSED CH	61+875
EX-STRUCTURE	RCC T Beam,RCC Sub Structure,Open Foundation
PROPOSALS	5 x 13.5m New Construction
HPL LEVEL	186.620



**Annexure 6.3. Drawings of Realignment Locations Proposed for Corridor 5:  
Mohanur – Rasipuram Road (SH 95)**

BM PILLAR DETAILS	
CHAINAGE (Km/m)	2/000
NO.	BM8
EASTING (X)	843443.955
NORTHING (Y)	1225834.635
ELEVATION (Z)	122.910

Horizontal Curve Details	
Curve Number	5
HP Chainage	2+270.060
Easting	843488.059
Northing	1226098.334
Deflection Angle	34° 19' 11.954"
Radius	750.0m
Leading Ls	35m
Trailing Ls	35m
Tangent Length	249.111
Curve Length	414.248m
External Ordinate	35.013m
e%	3.8
V kmph	80



**MINOR BRIDGE**  
 EXISTING KM: 2282  
 PROPOSED CH: 2279  
 EX-TYPE: MINOR BRIDGE  
 PROPOSALS: 3 cells of RCC Box Bridge 5m x 2.5m (12.9m Width)  
 New Construction

BM PILLAR DETAILS	
CHAINAGE (Km/m)	2/300
NO.	BM9
EASTING (X)	843517.017
NORTHING (Y)	1226107.738
ELEVATION (Z)	120.214

**Legend Proposed (Plan)-**

	CENTRE LINE
	CARRIAGEWAY
	PAVED SHOULDER
	EARTHEN SHOULDER
	UTILITY CORRIDOR
	PROPOSED RIGHT OF WAY
	OPEN DRAIN
	FOOTPATH CUM DRAIN
	CURVE POINT
	RETAINING WALL

**Legend Existing-**

	EX-CENTRELINE
	EX-COMPOUND/FENCE LINE
	EX-ROW
	EX-SHOULDER LINE
	EX-CARRIAGEWAY
	STRUCTURE
	EXISTING BRIDGE
	EXISTING CULVERT

	FURLONG STONE
	KILOMETRE STONE
	BENCH MARK PILLAR
	GPS PILLAR
	TELEPHONE POLE
	ELECTRIC POLE
	OPTIC FIBRE CABLE
	TREE
	SIGN BOARD

**NOTE:-**  
 1. ALL DIMENSION ARE IN METER UNLESS OTHERWISE SPECIFIED.

**TAMILNADU ROAD SECTOR PROJECT**

Client: TAMILNADU ROAD SECTOR PROJECT

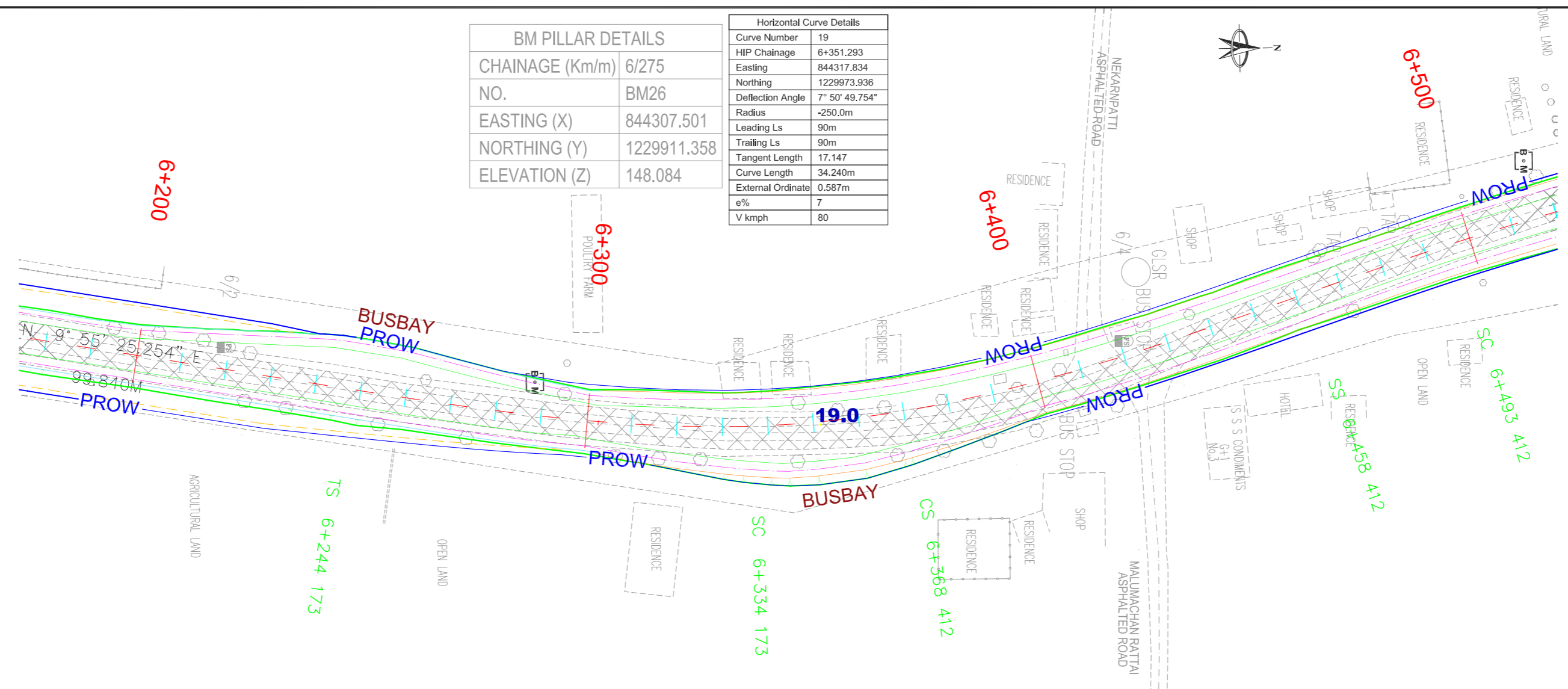
Consultant: CDM SMITH INDIA PVT LTD (Formerly Wilbur Smith Associates Pvt Ltd.)

Date	Revision	Scale @ A0:
Designed: SDA		N.T.S
Drawn: BVMS		N.T.S
Checked: VSG		N.T.S
Approved: SRN		N.T.S

Project				
PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PPC03				
Drawing Title				
CORRIDOR-05 RASIPALAYAM REALIGNMENT PLAN FROM CH : 2+000 TO 2+500				
Date	Project No.	Drawing No.	Sheet No.	Rev.
MAY - 2014	1314044	TNRSP II-1D-21-005	1 OF 2	PPR

BM PILLAR DETAILS	
CHAINAGE (Km/m)	6/275
NO.	BM26
EASTING (X)	844307.501
NORTHING (Y)	1229911.358
ELEVATION (Z)	148.084

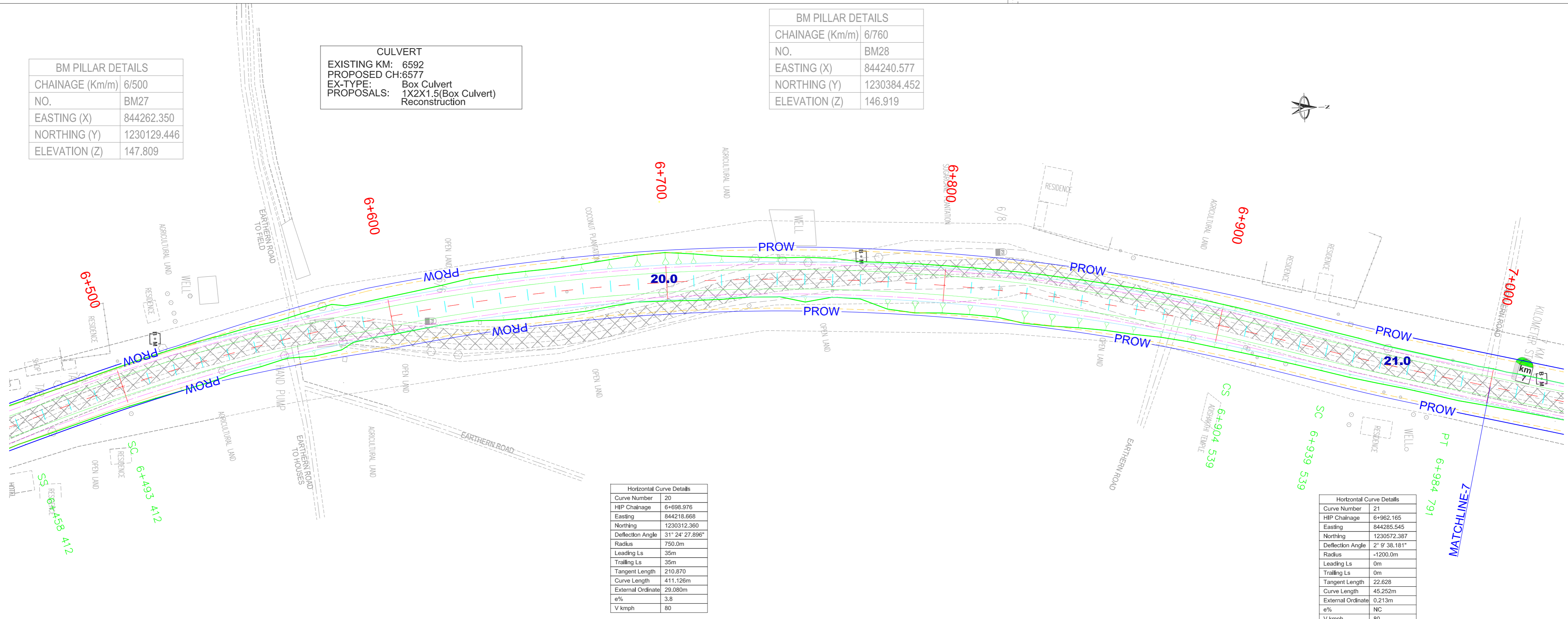
Horizontal Curve Details	
Curve Number	19
HIP Chainage	6+351.293
Easting	844317.834
Northing	1229973.936
Deflection Angle	7° 50' 49.754"
Radius	-250.0m
Leading Ls	90m
Trailing Ls	90m
Tangent Length	17.147
Curve Length	34.240m
External Ordinate	0.587m
e%	7
V kmph	80



BM PILLAR DETAILS	
CHAINAGE (Km/m)	6/760
NO.	BM28
EASTING (X)	844240.577
NORTHING (Y)	1230384.452
ELEVATION (Z)	146.919

CULVERT	
EXISTING KM:	6592
PROPOSED CH:	6577
EX-TYPE:	Box Culvert
PROPOSALS:	1X2X1.5(Box Culvert) Reconstruction

BM PILLAR DETAILS	
CHAINAGE (Km/m)	6/500
NO.	BM27
EASTING (X)	844262.350
NORTHING (Y)	1230129.446
ELEVATION (Z)	147.809



Horizontal Curve Details	
Curve Number	20
HIP Chainage	6+696.976
Easting	844218.668
Northing	1230312.360
Deflection Angle	31° 24' 27.896"
Radius	750.0m
Leading Ls	35m
Trailing Ls	35m
Tangent Length	210.870
Curve Length	411.126m
External Ordinate	29.080m
e%	3.8
V kmph	80

Horizontal Curve Details	
Curve Number	21
HIP Chainage	6+962.165
Easting	844285.545
Northing	1230572.387
Deflection Angle	2° 9' 38.181"
Radius	-1200.0m
Leading Ls	0m
Trailing Ls	0m
Tangent Length	22.628
Curve Length	45.252m
External Ordinate	0.213m
e%	NC
V kmph	80

<p><b>Legend Proposed (Plan)-</b></p> <ul style="list-style-type: none"> <li> CENTRE LINE</li> <li> CARRIAGEWAY</li> <li> PAVED SHOULDER</li> <li> EARTHEN SHOULDER</li> <li> UTILITY CORRIDOR</li> <li> PROW</li> <li> PROPOSED RIGHT OF WAY</li> <li> OPEN DRAIN</li> <li> FOOTPATH CUM DRAIN</li> <li> CURVE POINT</li> <li> RETAINING WALL</li> </ul>	<p><b>Legend Existing-</b></p> <ul style="list-style-type: none"> <li> EX-CENTRELINE</li> <li> EX-COMPOUND/FENCE LINE</li> <li> EX-ROW</li> <li> EX-SHOULDER LINE</li> <li> EX-CARRIAGEWAY</li> <li> STRUCTURE</li> <li> EXISTING BRIDGE</li> <li> EXISTING CULVERT</li> </ul>	<ul style="list-style-type: none"> <li> FURLONG STONE</li> <li> KILOMETRE STONE</li> <li> BENCH MARK PILLAR</li> <li> GPS PILLAR</li> <li> TELEPHONE POLE</li> <li> ELECTRIC POLE</li> <li> OPTIC FIBRE CABLE</li> <li> TREE</li> <li> SIGN BOARD</li> </ul>
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**NOTE:-**  
1. ALL DIMENSION ARE IN METER UNLESS OTHERWISE SPECIFIED.

**TAMILNADU ROAD SECTOR PROJECT**

**CDM SMITH INDIA PVT LTD**  
(Formerly Wilbur Smith Associates Pvt Ltd.)

Date	Revision	Scale @ A0:
Designed: SDA		N.T.S
Drawn: BVMS		Scale @ A2:
Checked: VSG		N.T.S
Approved: SRN		

PROJECT PREPARATION CONSULTANCY SERVICES FOR PREPARING DETAILED PROJECT REPORT (DPR) FOR TNRSP II - PPC03			
Drawing Title		CORRIDOR-05 NEIKKARANPATTI REALIGNMENT PLAN FROM CH : 6+200 TO 7+000	
Date:	Project No.	Drawing No.	Sheet No.
MAY - 2014	1314044	TNRSP II-1D-21-005	2 OF 2
			Rev. PPR

### Annexure 7.1. Activity-Impact Identification Matrix

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
<b>A. Project Preparation Phase</b>					
A.1.	Preparation of Detailed Project Report	Land	Loss of productive land	Major	-ve, P
			Impacts due to siting of project related facilities	Major	-ve, P
			Soil erosion	Major	-ve, P
			Destabilization of slope	Medium	-ve, P
			Soil contamination due to spillage of oil and lubricants	Medium	-ve, P
			Blocking of natural drainages and filling of water bodies leading to water logging / flooding of adjacent low lying areas	Major	-ve, P
		Water	Contamination of water due to spillage of oil and lubricants and surface runoff with sediments from construction camps	Medium	-ve, P
			Contamination of water due to sewage from construction camps, labour camps, toll plazas, rest areas and truck lay byes	Medium	-ve, P
			Contamination of water due to foundation work for bridges.	Medium	-ve, T
			Alterations to natural drainage patterns	Major	-ve, P
			Reduced ground water recharge due to impervious pavement	Major	-ve, P
			Exploitation of ground water for construction.	Major	-ve, P
		Air	Increase in air pollution	Major	-ve, P
		Noise	Increase in noise levels	Major	-ve, P
		Biological	Loss of trees	Major	-ve, P
			Impact on forests and natural habitats	Major	-ve, P
	Loss of land, structures and livelihoods	Major	-ve, P		

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Socio-economic	Loss of cultural properties	Major	-ve, P
			Shifting of community utilities and CPRs	Major	-ve, T
			Loss of access due to cutting of hill slopes / embankment construction	Major	-ve, P
			Road accidents	Major	-ve, P
		Solid Waste management	Generation of debris	Medium	-ve, P
<b>B.</b>	<b>Pre-Construction Phase</b>				
B.1.	Land Acquisition	Land	No impact	-	-
		Water	No impact	-	-
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	No impact	-	-
		Socio-economic	Loss of land, buildings and livelihood, loss of cultural properties and common property resources (CPRs)	Major	-ve, P
		Solid waste management	No impact	-	-
B.2.	Relocation of utilities	Land	No impact	-	-
		Water	No impact	-	-
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	No impact	-	-
		Socio-	Damages to utilities and inconvenience to public	Medium	-ve, T

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		economic			
		Solid waste management	No impact	-	-
B.3	Identification of site for construction camp	Land	Loss of topsoil, soil contamination due to spillage of fuel, lubricants and hazardous chemicals	Medium	-ve, T
		Water	Surface water pollution due to run off from the site containing oil and silt, and waste water from vehicle washing area and sewage from toilets.	Medium	-ve, T
		Air	Air pollution due to fugitive dust and gaseous emissions from hot mix plant and diesel generator .	Medium	-ve, T
		Noise	Noise pollution due to generator, machineries and movement of vehicles	Medium	-ve, T
		Biological	Loss of trees, Impact on forests and wildlife habitats	Medium	-ve, T
		Socio-economic	Inconvenience to local traffic in access roads to construction camp	Medium	-ve, T
		Solid waste management	No impact	-	-
B.4.	Identification of site for labour camps	Land	Loss of top soil and soil productivity due to soil compaction	Medium	-ve, T
		Water	Unsafe disposal of domestic sewage to nearest water body.	Medium	-ve, T
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	Cutting of trees / collection of fire wood and non-timber forest produce (NTFP) from forest, hunting of wild animals, occurrence of forest fire.	Minor	-ve, T
		Socio-economic	Impact on Public health and law and order	Medium	-ve, T

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Solid waste management	No Impact	-	-
B.5.	Identification of site for quarrying and stone crushing operations	Land	Loss of productive land, destabilization of slopes due to modification of natural conditions	Major	-ve, P
		Water	Surface water pollution due to run off from the site	Minor	-ve, T
		Air	Increased air pollution due to fugitive dust	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	Loss of trees, Impact on forests and wildlife habitats	Minor	-ve, T
		Socio-economic	Risk for local inhabitants and passengers through nearby roads, railways, ropeways and waterways. Inconvenience to local traffic in access roads to quarry and crusher	Medium	-ve, T
		Solid waste management	Impacts due to improper disposal of overburden from quarry site.	Minor	-ve, T
B.6.	Identification of borrow sites	Land	Loss of productive land, loss of top soil, soil erosion, alterations in local topography, flooding of land due to collapse of river bund / irrigation tank bund.	Major	-ve, P
		Water	Collapse of irrigation tank bund and loss of irrigation water.	Minor	-ve, T
		Air	Increased air pollution due to fugitive dust	Minor	-ve, T
		Noise	Increase in noise levels	Minor	-ve, T
		Biological	Loss of trees, Impact on forests and wildlife habitats	Minor	-ve / T
		Socio-economic	Inconvenience to local traffic in access roads to borrow area, Occurrence of water borne diseases due to accumulation of water in borrowed lands.	Medium	-ve / T



Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Solid waste management	No impact	-	-
B.7.	Identification of water sources	Land	No impact	-	-
		Water	Ground water depletion	Major	-ve, P
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	No impact	-	-
		Socio-economic	Reduction in water available for agriculture and domestic purposes	Major	-ve, P
		Solid Waste Management	No impact	-	-
B.8.	Identification of site for debris / excess soil disposal	Land	Loss of soil productivity, soil contamination, soil erosion	Medium	-ve, P
		Water	Surface water pollution due to run off from the debris and soil	Minor	-ve, T
		Air	Air pollution due to fugitive dust during dumping of debris and soil	Medium	-ve, T
		Noise	Noise pollution due to movement of vehicles and dumping of debris.	Minor	-ve, T
		Biological	Loss of vegetative cover, impact on wildlife habitats	Medium	-ve, P
		Socio-economic	Obstruction to movement of local inhabitants, affect the safety and aesthetical beauty of the locality.	Minor	-ve, P
		Solid waste management	No impact	-	-
<b>C.</b>	<b>Construction Phase</b>				
<b>C.1.</b>	<b>Site Preparation Activities</b>				
C.1.1.	Setting up of	Land	Soil contamination due to spillage of fuel and lubricants, soil erosion due to	Medium	-ve, P

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
	construction camp		surface run off.		
		Water	Contamination of water due to spillage of oil and lubricants and surface runoff with sediments from construction camps. Contamination of water due to sewage from construction camps	Medium	-ve, T
		Air	Air pollution due to fugitive dust and gaseous emissions from hot mix plant and diesel generator	Medium	-ve, T
		Noise	Increase in noise level due to diesel generator, other machineries and vehicles	Medium	-ve, T
		Biological	Loss of vegetation	Medium	-ve, P
		Socio-economic	Occupational health and safety impacts for workers	Medium	-ve, P
		Solid Waste management	Unscientific disposal of debris / solid waste	Medium	-ve, P
C.1.2.	Setting up of labour camp	Land	Loss of soil productivity	Medium	-ve, T
		Water	Pollution of water bodies with sewage	Medium	-ve, T
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	Loss of vegetation	Minor	-ve, T
			Deforestation	Minor	-ve, T
		Socio-economic	Health impact due to fire accidents, Increase in communicable diseases	Medium	-ve, P
		Solid Waste management	Unhygienic environment due to unsafe disposal of waste generated.	Minor	-ve, T

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
C.1.3.	Setting up of Quarry and Crusher	Land	Loss of top soil	Major	-ve, P
		Water	Surface water pollution due to run off with sediments from the site	Medium	-ve, T
		Air	Air pollution due to fugitive dust and emissions from diesel generator	Major	-ve, T
		Noise	Noise pollution due to Crusher	Major	-ve, T
		Biological	Loss of vegetation	Medium	-ve, P
		Socio-economic	Occupational health and safety impacts for workers, Risk for local inhabitants and passengers through nearby roads, railways, ropeways and waterways.	Medium	-ve, P
		Solid Waste Management	No impact	-	-
C.1.4.	Setting up of borrow area	Land	Loss of topsoil, soil erosion	Major	-ve, P
		Water	Pollution of water bodies due to surface run off.	Medium	-ve, T
		Air	Air pollution due to fugitive dust.	Medium	-ve, T
		Noise	No impact	-	-
		Biological	Loss of trees	Medium	-ve, P
		Socio-economic	Risk for local inhabitants due to trespassing	Medium	-ve, T
		Solid Waste Management	No impact	-	-
C.1.5.	Preparation of debris disposal site	Land	Loss of productive land, erosion of disposed soil	Major	-ve, P
		Water	Surface water pollution due to run off from the site	Minor	-ve, T
		Air	No impact	-	-
		Noise	No impact	-	-

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Biological	Loss of trees	Minor	-ve, P
		Socio-economic	Risk for local inhabitants due to trespassing	Minor	-ve, T
		Solid waste management	No impact	-	-
C.1.6.	Clearing, Grubbing and Stripping	Land	Destabilization of slopes, soil erosion.	Medium	-ve, T /P ?
		Water	No impact	-	-
		Air	Change in micro climate	Minor	-ve, T
		Noise	Increase in noise levels	Minor	-ve, T
		Biological	Loss of vegetative cover and impact on fauna	Major	-ve, P
		Socio-economic	Loss of tree shade. Safety of pedestrians and passers by.	Minor	-ve, T
		Solid waste management	Unscientific / unsafe disposal of tree waste	Minor	-ve, T
C.1.7.	Cutting of Earth	Land	Loss of topsoil, water logging due to alterations in natural drainage patterns.	Major	-ve, P
		Water	Blocking of cross drainage and water logging, contaminating water bodies	Major	-ve, P
		Air	Increased air pollution due to fugitive dust/ emissions.	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	No impact	-	-
		Solid waste	Unscientific/ unsafe disposal of over burden	Medium	-ve, P

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		management			
C.1.8.	Filling	Land	Loss of topsoil, alteration of natural drainage patterns.	Major	-ve, P
		Water	Diversion of natural surface water flows, alterations/blocking of cross drainage and water logging.	Medium	-ve, P
		Air	Increased air pollution due to fugitive dust / emissions.	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Flooding of adjacent low lying land	Medium	-ve, P
		Solid waste management	No impact	-	-
C.1.9.	Stripping	Land	Loss of topsoil, removal of vegetation.	Major	-ve, P
		Water	Pollution of water bodies due to irresponsible handling of stripped earth.	Medium	-ve, P
		Air	Increased air pollution	Major	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	No impact	-	-
		Solid waste management	No impact	Medium	-ve, T
C.1.10.	Demolition	Land	No impact	-	-
		Water	No impact	-	-

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Air	Increased air pollution due to fugitive dust	Medium	-ve, T
		Noise	Increase in noise levels due to demolition activity	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	No impact	-	-
		Solid waste management	Unscientific / unsafe disposal of debris	Medium	-ve, P
<b>D.2.</b>	<b>Construction Activities</b>				
D.2.1.	Operation of construction camp	Land	Complete elimination of productive capacity of soil, spillage of fuel, lubricants and hazardous chemicals.	Medium	-ve, T
		Water	Surface water pollution due to run off and waste water / sewage disposal from the camps.	Medium	-ve, T
		Air	Increase in air pollution due to operation of machineries.	Medium	-ve, T
		Noise	Increase in noise level due to operation of machineries.	-	-
		Biological	Loss of vegetation	-	-
		Socio-economic	Occupational health and safety impacts for workers	Major	-ve, P
				Major	-ve, P
Solid waste management	Unscientific / unsafe disposal of debris / waste	Major	-ve, P		
D.2.2.	Functioning of labour camp	Land	Contamination of soil due to waste water	Medium	-ve, T
		Water	Surface water pollution due to run off from the site	Medium	-ve, T
		Air	Air pollution due to burning of dry waste/ fire wood.	Minor	-ve, T

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Minor)	Nature of impact (+ve/-ve, T/P)
		Noise	No impact.	-	-
		Biological	Loss of trees, Impact on forests, spread of forest fire	Minor	-ve, T
		Socio-economic	Increase in communicable diseases Increase in crime rate Indulgence in hunting and collection of forest produces.	Medium	-ve, T
			Collection of firewood if camp is near the forest Chances of forest fires	Medium	-ve, T
			Occurrence of accidents	Medium	-ve, T
		Solid waste management	Unhygienic environment due to unsafe disposal of solid waste generated.	Minor	-ve, T
D.2.3.	Quarrying and operation of crushers	Land	Loss of soil productivity, soil contamination	Major	-ve, P
		Water	Surface water pollution due to run off from the site	Medium	-ve, P
		Air	Air pollution due to fugitive dust.	Medium	-ve, T
		Noise	Noise pollution due to stone blasting	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Safety of labourers	Medium	-ve, P
		Solid waste management	No impact	-	-
D.2.4.	Borrowing of earth	Land	Loss of fertile lands, loss of topsoil, soil contamination, removal of vegetation, soil erosion, destabilization of slopes due to modification of natural conditions.	Major	-ve, P
		Water	Alterations in local drainage pattern, diversion of natural surface water flows,	Medium	-ve, P

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
			blocking of cross drainage and water logging.		
		Air	Increased air pollution due to fugitive dust	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Occupational health and safety impacts	Medium	-ve, P
				Major	-ve, P
		Solid waste management	No impact	-	-
D.2.5.	Extraction of Surface water	Land	No impact	-	-
		Water	Over exploitation of surface water	Major	-ve, P
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	Impact on fauna in lakes and rivers	Major	-ve, P
		Socio-economic	Reduction in water available for agriculture and domestic purposes	Major	-ve, P
		Solid waste	No impact	-	-
D.2.6.	Transportation of materials	Land	Spillage of fuel, lubricants and hazardous chemicals.	Major	-ve, P
			Damage of haul road due to over usage.	Major	-ve, P
		Water	Contamination of water due to washing of vehicles, construction equipments and machineries	Major	-ve, P
		Air	Increased air pollution due to fugitive dust	Major	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T



Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Biological	No impact	-	-
		Socio-economic	Inconvenience to local travelers. Increase in accidents	Medium	-ve, T
		Solid waste management	No impact	-	-
D.2.7.	Scarifying of existing bituminous layer	Land	No impact	-	-
		Water	No impact	-	-
		Air	Increased air pollution due to fugitive dust	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Health impact on workers due to air and noise pollution	Medium	-ve, P
		Solid waste management	Unscientific / unsafe disposal of debris / waste	Medium	-ve, P
D.2.8.	Compacting earth and laying of sub-base course	Land	No impact	-	-
		Water	No impact	-	-
		Air	Increased air pollution	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Disruption of Traffic	Medium	-ve, T
			Occurrence of accidents	Major	-ve, P

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		Solid waste management	Utilisation of fly ash	Major	+ve, P
			Unscientific/ unsafe disposal of excess soil	Major	-ve, P
D.2.9.	Laying base course and surface course	Land	No Impact	-	-
		Water	No Impact	-	-
		Air	Increased air pollution due to fugitive dust generation	Major	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Disruption of Traffic	Major	-ve, T
			Occurrence of accidents	Major	-ve, P
Solid waste management	No impact	-	-		
D.2.10.	Construction of bridges, culverts	Land	Spillage of fuel, lubricants and hazardous chemicals	Major	-ve, P
		Water	Water pollution due to infusion of slurry into the water body during foundation construction.	Major	-ve, P
			Impact on water quality due to remnants of construction materials.		
		Air	Increased air pollution	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	Impact on aquatic biota due to disposal of construction material	Major	-ve, P
		Socio-economic	Disruption of Traffic	Medium	-ve, T
Occurrence of accidents	Major		-ve, P		
Solid waste	Unscientific / unsafe disposal of debris	Medium	-ve, P		

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		management			
D.2.11.	Construction of flyovers, grade separators, ROBs.	Land	Spillage of fuel, lubricants and hazardous chemicals	Medium	-ve, P
		Water	No impact	-	-
		Air	Increased air pollution	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Disruption of Traffic	Medium	-ve, T
			Occurrence of accidents	Major	-ve, P
Solid waste management	Unscientific / unsafe disposal of debris	Medium	-ve, P		
D.2.12.	Construction of underpasses (pedestrian/cattle and wild animal)	Land	Contamination of soil due to spillage of oil, lubricants and hazardous chemicals	Major	-ve, P
		Water	Contamination water due to spillage and careless handling of oil and lubricants	Medium	-ve, T
		Air	Increased air pollution	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Disruption of Traffic	Medium	-ve, T
			Occurrence of accidents	Major	-ve, P
Solid waste management	Unscientific / unsafe disposal of debris	Medium	-ve, P		
D.2.13.	Construction of drains,	Land	Spillage of fuel, lubricants and hazardous chemicals	Medium	-ve, P
		Water	No Impact	-	-

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
	utilities, RWH pits etc.	Air	Increased air pollution	Medium	-ve, T
		Noise	Increase in noise levels	Medium	-ve, T
		Biological	No impact	-	-
		Socio-economic	Occurrence of accidents	Major	-ve, P
		Solid waste management	Unscientific / unsafe disposal of debris	Medium	-ve, P
D.2.14.	Debris disposal	Land	No impact	-	-
		Water	No impact		
		Air	No impact	-	-
		Noise	No impact	-	-
		Biological	No impact	-	-
		Socio-economic	No impact	-	-
		Solid waste management	No impact	-	-
D.2.15.	Roadside plantation and landscaping	Land	Beautification, vegetation cover, protects soil erosion	Medium	+ve
		Water	Facilitates ground water recharge	-	-
		Air	Improvement in air quality	-	-
		Noise	Reduces noise pollution to adjacent areas.	-	-
		Biological	Increase in vegetation cover	-	-
		Socio-	Improved aesthetics	-	-

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
		economic			
		Solid waste management	Unscientific / unsafe disposal of debris	Medium	-ve
<b>E.</b>	<b>Post Construction Phase</b>				
E.1.	Redevelopment of construction camp sites	Land	Rejuvenation of land	Major	+ve
		Water	Increased water recharge	Major	+ve
		Air	Improvement in air quality	Medium	+ve
		Noise	No impact	-	-
		Biological	Increased vegetation	Medium	+ve
		Socio-economic	No impact	-	-
		Solid waste management	No impact	-	-
E.2.	Redevelopment of quarry sites	Land	Rejuvenation of land	Major	+ve
		Water	Increased water recharge	Major	+ve
		Air	Improvement in air quality	-	-
		Noise	No impact		
		Biological	Increased vegetation	Medium	+ve
		Socio-economic	Involvement of local community and enhancement of their livelihood	Medium	+ve
		Solid waste management	No impact	-	-
E.3.		Land	Rejuvenation of land	Major	+ve

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
	Redevelopment of borrow sites	Water	Increased water recharge	Major	+ve
		Air	Improvement in air quality	Medium	+ve
		Noise	No impact	-	-
		Biological	Increased vegetation	Medium	+ve
		Socio-economic	Involvement of local community and enhancement of their livelihood	Medium	+ve
		Solid waste management	No impact	-	-
E.4.	Redevelopment of labour camp sites	Land	Rejuvenation of land	Major	+ve
		Water	Increased water recharge	Major	+ve
		Air	Improvement in air quality	Medium	+ve
		Noise	No impact	-	-
		Biological	Increased vegetation	Medium	+ve, P
		Socio-economic	No impact	-	-
		Solid waste management	No impact	-	-
E.5.	Operationalization of the project stretch	Land	Improvement of road geometry and pavement condition	Major	+ve, P
		Water	Water logging during monsoon will not take place.	Major	+ve, P
		Air	Reduced dust generation from road. Increased vehicular emissions due to increased traffic	Medium	-ve and +ve, P
		Noise	Increase in the ambient noise levels, especially during night time along the project	Medium	-ve, T

Sl. No.	Activity	Environmental Attribute	Potential Impact	Degree of impact (Major/Medium/Minor)	Nature of impact (+ve/-ve, T/P)
			road.		
		Biological	Improved biodiversity and aesthetics	Medium	+ve, P
		Socio-economic	Less chances of accidents.	Major	+ve, T
			Safety	Major	+ve, P
		Solid waste management	No impact	-	-