

ENVIRONMENTAL ASSESSMENT REPORT
for the IMPROVEMENTS TO ROADS AND CONSTRUCTION OF
STORM WATER DRAINS
IN 9 URBAN LOCAL BODIES IN TAMIL NADU
under TNSUDP

JANUARY 2021

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O/o Commissionerate of Municipal Administration

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1 Introduction

Project Background

Commissioner of Municipal Administration has proposed to take up road improvement works in 9 ULBs (3 Corporations and 6 Municipalities) along with drains wherever necessary, under the ongoing TNSUDP. The ULBs are Erode, Tiruppur and Avadi Corporations and Tambaram, Devakottai, Paramakudi, Namakkal, Rasipuram and Tiruchengode Municipalities. The Detailed Project Report (DPR) for the same has been prepared by the respective ULBs.

Need for the Project

Many of the roads in these 9 ULBs have been damaged due to natural calamities, and implementation of infrastructure projects rendering the roads unfit for vehicular movement. The rainwater gets stagnated in the potholes on the riding surface of the roads and leads to inconvenience to traffic and causes health hazards to public. In some of the areas, even pedestrians could not walk safely. Therefore, the damaged roads necessitate immediate improvements. In addition to the road improvements, wherever required, upgradation / new road side drains (linking with existing drains) are also proposed to ensure continuous drainage thus preventing water stagnation and submergence disrupting the environment, safety and health.

Town Profile

1.3.1 Tambaram Municipality

Tambaram is situated 24 K.M. south of the capital city of Chennai. The famous Grand Southern Trunk Road and Railway route from Chennai Egmore to Kanyakumari divide the town into east and West. The Municipal Town, Tambaram is described as Gateway of the Beautiful Metropolitan City, Chennai. Tambaram is very popular because of the existence of world-renowned Madras Christian College, IAF training center, and the first commissioned suburban trains from Tambaram to Beach. Nowadays almost all trains to southern parts of Tamil Nadu start only from Tambaram. This Municipal Town is also proud of being home to a number of industrial units established at the Madras Export Processing Zone (MEPZ). Tambaram Town is also well known for its reputed educational institutions. Due to rapid development and growth of the town commercially and residentially, the Municipality is now classified as a Special Grade

Municipality. The population as per 2011 census is 1,64,830 besides a floating population of more than 1 lakh per day. The extent of the municipality is 20.72 sq.km.

1.3.2 Devakottai Municipality

Devakottai is a first-grade [municipality](#) in the state of [Tamil Nadu, India](#). Located in the [Sivaganga district](#), the town is situated close to the city of [Karaikudi](#), near Rameswaram National Highway Road (NH-210). It is one of the major cities comes under the Chettinad area with rich heritage of houses built with limestone called "Karaiveedu". This Region is one of the towns in [Chettinad](#) belt. The town is famous for its ancient temple Sri Meenakshi Sundareswarar temple also known as Nagara Sivan Kovil. As of 2011, the town had a population of 76,037. The area of the town is 12.42 sq.km. The town is divided into 27 wards.

1.3.3 Paramakudi Municipality

Paramakudi Municipality is a First Grade Municipality in the Ramanathapuram District of Tamil Nadu. The river [Vaigai](#) flows through Paramakudi on its way to the [Bay of Bengal](#). [NH 87](#) and [AH 43](#) passes through this town, which connects the rest of the district to [Sivaganga](#). Paramakudi railway station is the second-highest income-generating station after Rameswaram in the district Ramanathapuram. The station also connects major cities across India such as Tirupathi, Allahabad, Hyderabad, Ernakulam, Okha, Bhubhaneshwar, Faridabad and Manduvadhi. According to the [2011 census](#), the population of Paramakudi Municipality is 95,579 and the area of the town is 13.45 Sq.km.

1.3.4 Namakkal Municipality

Namakkal is a Selection Grade Municipality and also District Head Quarters of Namakkal District bifurcated from Salem District with effect from 1.1.1997. It is situated at about 53 km. south of Salem in Salem - Karur National Highway. The area of this Municipality is 55.00 sq. km. It lies between 11.00 and 11.360 North Latitude and 77.280 and 78.300 East Longitude. The population as per 2011 census is 120957. There are 39 wards in the Municipality. Nine village panchayats namely Chinnamudalaipatty, Mudalaipatty, Kosavampatty, Kondisettipatty, Periyapatty, Kavettipatty, Nallipalayam, Ayyampalayam and Thummankurichi were added with Namakkal Municipality vide G.O.Ms No: 260 MA&WS dated 25.10.2010. The total length of roads in Namakkal Municipality is estimated as 430.215 km. The total length of road maintained by National Highway passing through the town is about 15.865 km. The Municipality maintains a total road length of 414.35 km, with 18.9% being Cement Concrete

roads, 80.1% BT roads and 1% Earthen roads. Namakkal town is a Fort City and predominant activities are Poultry and Truck & Lorry body building, Fleet Operations and Manufacturing of rig machineries & operations.

1.3.5 Tiruchengode Municipality

Tiruchengode is a Selection Grade Municipality in Namakkal District. This is one of the oldest municipality constituted in 1928 as Grade III municipality. Tiruchengode is located 21 km east of Erode-Rasipuram Highway and also connected by road with major towns such as Salem and Namakkal. The extent of the town is 25.20 sq.km. The population of the town is 95335 as on 2011 and is divided into 33 wards. The length of the roads in the Municipality is 127.70 kms.

1.3.6 Rasipuram Municipality

Rasipuram Municipality is First Grade Municipality in Namakkal District and an extent of 8.15 Sq. Km. with population of 50244. It is situated at above 25 Km. from Salem at 25 Km. from Namakkal. This Town is divided in to 27 wards. The main occupation of the people is manufacturing of Ghee, Handloom Silk Sarees and Good Educational Institutions. Rate of water supply at present in 93 LPCD. Length of road in this town is 68.789 Km.

1.3.7 Erode Corporation

Erode City Municipal Corporation was formed in the year 2008 by grouping five municipalities viz (1) Erode (2) Veerappanchatharam (3) Kasipalayam (4) Surampatty and (5) Periyasemur and 7 other Town Panchayats viz. B.P.Agraharam , Suriyampalayam , Gangapuram , Ellapalayam , Villarasanpatty , Thindal & Muthampalayam. The total area of this Corporation is 109.52 sq.km and the total population as per 2011 census is 498121.

1.3.8 Tiruppur Corporation

Tiruppur City Municipal Corporation was formed by annexing adjoining local bodies viz. as Nallur & Velampalayam Municipalities and Andipalayam, Chettipalayam, Mannarai, Murugampalayam, Muthanampalayam, Nerupherichal, Thottipalayam & Veerapandi, Village Panchayats. The administrative area of the Corporation is 159.35 Sq.km. with a total population of 8,77,778 as per 2011 census. The Corporation is divided into 60 wards for administrative purposes.

1.3.9 Avadi Corporation

Avadi Municipal Corporation is one among the 15 municipalities in Chennai Metropolitan Area (CMA). It is situated at a distance of about 25 KM on the western side of the

city on Chennai-Thiruvallore High Road. A number of industries, educational institutions have been set up in this corporation. Though this corporation is located far away from the city, by establishment of industrial and educational institutions and access to this area enabled by suburban train facility from the city, the resulting growth in population is increasing. This corporation is bounded by Ambattur corporation in the east, Vallanur, Pottur villages in the north, Nemilichery and Palavedu village panchayats in the west, and Kannapalayam and Ayyambakkam village panchayats in the south. This corporation consists of about 2467 streets / roads in 48 wards. The total length of streets / roads is about 773.00KM. The major industries located here are Heavy Vehicles Factory, DPI etc and educational institutions like Murugappa Poly-technic etc. The population as per 2011 census is 344701. The extent of the municipality is 65.00 sq.km. It spreads over an area of about 65 square KM stretching to about 11 KM from east to west and about 6 KM from north to south.

■ Project Proposal

The proposed activities for road improvements include restoration of damaged roads and upgrading/providing storm water drains wherever required.

The major project proposals are as below

- Providing Bituminous Tar roads improvements
- Providing new Paver block roads
- Providing Cement Concrete roads
- Providing storm water drains and culverts for cross drainage

■ Project Environmental Categorisation

The project proposal envisages providing road improvements along with construction of storm water drains (new/ demolition & reconstruction/ raising, etc.). Road improvements are on small lengths and the extent of impacts are expected to be minimal. Following the ESMF principles of impact based categorization and locational aspects and a review of the screening reports submitted by the ULBs, the project proposing both road improvements and construction of storm water drains/culverts in the 9 ULBs is categorized as E2.

For E2 projects

- (i) EIA is to be carried out and site specific EMP is to be prepared for implementation.
- (ii) EIA is to be disclosed in the websites of ULBs and TNUIFSL.
- (iii) EMP shall be included in the bid document with monitoring requirement.
- (iv) EMP mitigation measures shall be closely monitored and reported to TNUIFSL.

In view of the similar nature of the project proposals and since issues envisaged from project implementation in urban environment are common, complying with the safeguard requirement, EIA covering all the 9 sub-projects has been prepared and which will be disclosed in the websites of the nine ULBs and TNUIFSL. The Environmental Management Plan (EMP) has been prepared considering the proposed project activities and is provided in the report.

■ Structure of EIA Report

Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Regulatory Framework
Chapter 4	Baseline Environment
Chapter 5	Environmental Impact Assessment
Chapter 6	Analysis of Alternatives
Chapter 7	Environmental Management Plan
Chapter 8	Stakeholder Consultation
Chapter 9	Implementation Arrangement

2 Project Description

The roads damaged due to natural calamities and implementation of underground sewerage and water supply schemes, etc, has been proposed for improvement and relaying of roads. The nature of restoration and relaying has been suitably decided based on the traffic volume, purpose of connectivity and the width of road. Accordingly, the roads have been selected and proposed for Bituminous Surface and cement concrete pavement.

In the case of Black Topping Road, Granular Surface Base of 150mm thick has been provided to improve the CBR value. In the case of Cement Concrete Road, a layer of 150mm thick quality concrete of mix 1:1.5:3 is proposed. The roads and the culverts proposed for improvement has been designed based on the IS standards and following MORTH specifications. The details of the components envisaged are as follows:

- Providing GSB of 150mm thick
- Providing WMM of 150mm thick
- Providing prime coat over WMM of 7kg / 10 m²
- Providing tack coat of 2.5 kg / 10 m²
- Providing 50mm thickness DBM
- Providing 30mm thickness BC
- Thermoplastic paint
- Providing sign board
- Providing Storm water drains

Summary of the project proposal is provided in the table below.

S.No	Name of ULB	Roads						Drains & Culverts				Others
		Number of roads	BT	Earthen	Cement Concrete	Pave r Bloc k	Total Roads	D&R	Ne w	Total Drain s	Culverts	
1	Tambaram	93	18.00 5				18.00 5	0.54		0.54		2.134 km retain ing wall

2	Devakottai	71	18.18			1.84	20.02		2.3	2.3	9	
3	Paramakudi	44	8.78			5.89	14.67	2.42	3.63	6.05		3.15 km kerb wall
4	Namakkal	36	7.02	10.28			17.3		7.46	7.46		
5	Tiruchengode	39	13.53				13.53	5.84		5.84	66	
6	Rasipuram	41	13.74				13.74	11.54		11.54	25	
II Corporations												
7	Erode	146	30.29				30.29		1.64	1.64		
8	Tiruppur	45	12.84		2.391		15.23		2.13	2.13		
9	Avadi	33	3.61	9.845	0.72		14.17		0.35	0.35		

The details of project activities along with the packaging and the project cost are as follows:

Pkg No.	Name of the Package	No of Roads in Package	Proposed Components				Length of New Storm Water Drain (in Km)	Length of Rehabilitated Storm Water Drain (in Km)	Other components if any Kerbwall in KM	Est Cost (Rs.in crores)
			Length of BT Road (in Km)	Length of Paver Block (in Km)	Total Length (in Km)	No of Culvert				
1	2	3	4	5	6	7	8	9	10	11
Tamparam Municipality										
1	Providing BT surface to Periyalwar street Ward-11, MGR street, Ward-13, Valmigi street W-13&14, Nagammal street Muthuramalingam street Ward-16, Chakkaravarthi street Salamon street, Salamon street Extn, Rajarao street W-17 Thangal karai street, VGN avenue Periyar street, Rajaji Street, Eswari Nagar, Eswari Nagar extn, Kannan street, School street, Raja Iyer street, Kulakkarai street, Vengadasamy street, Kannappar	24.00	4.70		4.70		0.00			2.00

	street Extn,Veerabathran street and Ranganathan street ward-19 East Tambaram in Tambaram Municipality (Package No.1)								
2	Providing BT surface to Dhanalakshmi street , Ista sithi vinayagar koil street, Ganesh Nagar Pillaiyar koil street ,Silapthigaram street, 100 Feet Road, Abirami street, Kannan Nagar,Gangai Amman Koil street, Sri Ram NAGar 3rd street, Sri Ram Nagar 4th street Ganabathy Colony , Vallalar street Ward -19 Jegajeevanram Nagar, Ponniamman Koil street, Ambedhkar Burial Ground Road Ricky Garden Main road , Ricky Garden 1st ,2nd,street ,1st cross street,2nd cross street 3rd cross street, 4th cross street Ward -21 MES road Ward -25 East Tambaram area in Tambaram Municipality (Package No.2)	23.00	4.11		4.11		0.00		2.00
3	Providing BT surface to Maruthi Avenue, Srinivasa Nagar, Vignesh Avenue 1st cross street,2nd cross street, 3rd cross street, 4th cross street, Ward -21, Jegajeevanram street Ward-22, SOS street IAF road Ward-23 Ashok Nagar North street Ward -24 MES second street, Thiruvalluvar street ,Kamatchi amman koil street Ward -25, Ashol Nagar Main road ,Suthanantha Barathi street (MSP Lane) Sengeniamman koil 1st street 2nd street Ward -26 Roja Thottam, Gothavati street, Thilagavathi Nagar Pillaiyar koil street and Arul Nagar Ward -27 East Tambaram area in Tambaram Municipality (Package No.3)	21.00	4.51		4.51		0.00		2.00
4	Providing BT surface and Retaining wall cross drainage works to Pulikoradu extn, Pulikoradu mainroad,	20.00	3.25		3.25		0.54		2.00

	Pulikoradu gangai amman kovil street Middle street, Durga Nagar W-38 Amman koil back side street W-01 and BT surface to Ranganathapuram 6h street and 6th cross street W-7 Kadaperi East Street, School street, Kalangal street, Kadaperi pillaiyar kovil street, Middle street Arputham Nagar Kulakkarai street, Thangalkarai street, Ward -01, Ranganathapuram 4th street Ward -05 Singaravelan street w-09 Nethaji street W-39 West Tambaram area in Tambaram Municipality (Package No.4)									
5	Providing WMM with BT surface, Retaining wall and cross drainage works to Vasantham Nagar Durga Nagar W-38 West Tambaram in Tambaram Municipality (Package No.5)	2.00	1.44		1.44		0.00			2.00
	Total	90.00	18.01	0.00	18.01	0.00	0.54	0.00	0.00	10.00
Devakottai Municipality										
1	Providing B.T Surface using CMP paver machine with Storm water drain and RCC culvert @ ward no. 1, Ram nagar 3rd street ,Ram nagar 2nd street cross,Ram nagar I st to 4th street and cross ,Ram nagar 4th street to 6th street cross (EB sub station),Alagapuri nagar 5th st,Alagapuri nagar cross st,Alagapuri nagar (Park back side),Sanjeevi puram road and cross,ward no. 2,Somasundaram nagar cross st, Thanicha oorani Burma colony main and cross road, New housing board road,Thanicha Oorani cross road in Devakottai Municipality.	12.00	4.50		4.50	4.00	0.51			2.60
2	Providing B.T Surface using CMP paver machine with Storm water drain and RCC culvert @	13.00	4.52		4.52	3.00	0.29			2.63

	ward no. 2,Thanicha oorani cross road, Panipulanvayal road,Cross road, Thiruppatur road cross road (Near TVS Show room), Thiruppatur road cross road (Kanchi periyavar nagar), Jeyamkonda vinayagapuram road,Ward no.3, Annasai East 4th cross road, Vivekananthapuram East,Thiruppatur road cross(Muthuraj nagar), Thiruppatur road cross (Opp.NSMVPS),Ward no. 11, Corporation road Extention and cross and Corporation road (Thayamangalam kovil road) in Devakottai Municipality.								
3	Providing B.T Surface using CMP paver machine with Storm water drain and RCC culvert @ Ward no.4, Sri Rengapuram East and cross road, Yogiram surathkumar nagar road and cross,Avarankadu Extention area ,Ward no. 5, Natarajapuram 1st street,Natarajapuram school road, ward.6, Eravuseri pathai cross road,Ward no. 11,Valliappa chetti oorani South and east street,Manthoppu street road,Manthoppu street road,Manthoppu street cross road,Gnanananthagiri nagar main and cross road and Saraswathi wasaha salai cross street in Devakottai Municipality.	13.00	4.60		4.60	4.00	0.42		2.55
4	Providing B.T Surface using CMP paver machine with Storm water drain and RCC culvert @ Ward no. 5,Nehru street cross,Ward no. 7,Dharmamuneeswarar street , Ward no. 8,Sivankovil East and south street ,Ward no. 9,Poosaikara natchiappan cross street ,Ward no. 13, Anna nagar 1st street and cross street,Ward	16.00	4.57		4.57	2.00	0.28		2.50

	no. 17,Arunachalapoigai oorani around road ,Ward no. 18,Vattanam road cross (Andavar Medical), Ward no. 19,Mulakkottu street, Ward no. 21 Chidambaranathapuram east cross,Ward no. 22, Jeevanagar road,Ward no. 23, Nithyakalyanipuram West and cross,Ward no. 24, Kailasanathapuram west cross road,K.VR.RM street ,P.L.S Oorani South and East road,ward.27,Thalambal nagar, Kattuoorani pathai in Devakottai Municipality.									
5	Providing Paver Block pavement with Storm water drain and RCC culvert to Ward. 2, Thanicha Oorani cross , Panipulan vayal cross, Ward.3, Anna salai East 3rd street,Vivekanatha puram East street,Anna salai cross,Vivekanatha puram North cross street,Ward.4,Renganna st cross,Ward.5,Vaithiyalingam cross street, ward.9,Sammanthar street cross road, Ward.11,Ganananthagiri nagar cross street,Ganananthagiri nagar cross street (Sai baba colony),Saraswathi wasaha salai cross street,ward.12,Tiruppathur road cross (Near Buvaneshwari Amman Kovil),ward.23,Krishnarajapuram east cross,Ward.25,Thenammai Oorani south street and Ward.27,Athangarai cross street in Devakottai Municipality.	17.00	1.84	1.84	4.00	0.08			1.12	
	Total	71.00	20.02	0.00	20.02	17.00	1.58	0.00	0.00	11.40

Paramakudi Municipality

I	Providing of B.T. Surface By using paver machine and Construction of storm water drain at Vaigai Nagar, Pudhu Nagar, Vilangammai Nagar and Devaraj nagar in ward No :01,33	4.00	2.23	-	2.23	4.00	2.08	-	-	2.00
II	Providing of B.T. Surface By using paver machine at Emanai Perumalkovil street, Burma colony, Jeevanagar, Kamaraj Nagar and Providing Paver block surface at Dharmarajapuram,SS colony,Kamarajar cross street,Patel street and Mudhaliyar street in Ward No :1,2,5,6,7,8,34	9.00	1.26	1.90	3.16	4.00	-	-	1.90	2.00
III	Providing of B.T. Surface By using paver machine and Construction of storm water drain at VP Colony, Burma colony, GandhiNagar and Providing Paver block surface at KamalaNehru Nagar, Jeevanagar, Pallivasal street and LIC back side in Ward No :2,3,8,25	8.00	2.06	1.08	3.14	4.00	0.60	-	0.48	2.00
IV	Providing of B.T. Surface By using paver machine and Construction of storm water drain at Railway feeder road,NSC Bose Road, BharathiNagar 3rd street, Melachathiram, Sathiyamoorthi street, Ayyadurai street and Providing Paver block surface at SM Agrakaram,Pavadi street, west pallivasal street, Ayyadurai lane, Karunanithipuram and AnnaNagar in Ward No:20,26,29,30,32	12.00	1.31	0.95	2.26	4.00	0.95	1.19	-	2.00
V	Providing of B.T. Surface By using paver machine and Construction of storm water drain at Sundarajapattinam, Balan Nagar, Ponnaiahpuram, MullaiNagar,ManiNagar and Providing Paver block surface at Kattuparamakudi AD Colony,Velalar street, AmbedkarNagar,Burma colony,	11.00	1.93	1.96	3.89	4.00	-	1.96	-	2.00

	Muthuvai timber cross street,Balan Nagar in ward No:24,25,27,28,34									
	Total	44.00	8.79	5.89	14.68	20.00	3.63	3.15	2.38	10.00
Namakkal Municipality										
1	PACKAGE - I - Providing BT surface with storm water drain at Tiruchencode to pathi nagar salem road,Salem road sub lane (opp to A to B),LMR Theatre to RP Pudur and RP Pudur main road, Anbu nagar -3,Ezhil nagar,Mudalaipatty to Bypass service road via (Urban health center), Roja nagar	7	3.70		3.70	8	1.00			1.75
2	PACKAGE - II - Providing BT surface with storm water drain at Kosavampatty VOC Nagar cross street, Kondichettipatty main road to vettaigoundan pudur, Alagu nagar Main road, Mullai nagar main road and cross street in ward no 12 & 38	4	3.60		3.60	5	0.30			1.85
3	PACKAGE III - Providing BT surface with storm water drain at Teachers colony road, Kurnji Nagar, Mohanur road Mahathma gandhi Nagar, Mohanur road Thiruvalluvar nagar, Mohanur road Kongu nagar and Paramathi road kongu nagar, Peiyapatty road cross street, Kottai colony, S.P.Pudur to Periyapatty road (Fire station) and S.P Pudur to sami nagar in ward no:27, 29, 37, 38 & 39	8	3.97		3.97	10	0.50			1.86
4	PACKAGE IV: Providing BT surface with storm water drain at Palapattraai mariyamman kovil street (Kavignar Ramalingam street), Podhupatty Road (Paramathi road to school), paramathi road to Bodupatty Road cross street (Near Work shop), Paramathi main road association bunk west side cross road and EB colony cross road in ward no : 14, 17	4	1.94		1.94	6	0.60			1.18
5	PACKAGE - V - Providing BT surface with storm water drain at EB colony ATC west cross st and Back side cross street, Ayyampalayam high School	5	1.98		1.98	9	1.01			1.73

	Road to T code Road, Palaniyandi street, Kondichettipatty Lake school east side Road, Nallipalyam Boyar colony in Ward no - 1, 7, 8, 15, 17 & 39									
6	Package VI: Providing BT surface with storm water drain at Nallipalyam main road to one Lake liter OHT Street, Nallipalyam Old Veg shop Street, Nallipalyam South Street, Nallipalyam oil Mill street, Mariyamman Kovil to T.code road, A.S.Pettai main road to south side road, Mariyamman Kovil to Bye pass, Nallipalayam Thiru Nagar street in ward no.1, 6, 7&16	8	2.11		2.11	8	0.80			1.63
	Total	36.00	17.30		17.30	46.00	4.21		0.00	10.00
Tiruchengode Municipality										
1	Providing BT Road and Strom water drain with Culvert at Nadukkadu Road Fromthondikkaradu main road to Sakthivel Nagar Road,Gayathri Garden Road (Nesavalar Colony Municipal School Opp),Sengodampalayam Therkuthottam road,Bankers Colony Road,Brinthavan nagar 1st Cross,Kootappalli L type and E type municipal School Surrounding, & Nesavalar Colony 5thCross. In ward No:1& 8,2,14,11,13,5	7	3.28		3.28	16	1.500		0	2.43
2	Suriyampalayam mettuppavadi cross street & Kuttai Theru,Rangasami pillai Street & Vadivel pillai street,Sattayanputhur Cross street Near vinayagar koil, Namakkal road to Ettimadai puthur road,Kailasampalayam to Senkodampalayam link Road,Kootappalli,Thondikkaradu main road to OHT Road ward no.9,Kumaresapuram Cross street . In ward No:10,9,16,4,3,12,9,6	8	3.60		3.60	16	1.450			2.57
3	Providing BT Road and Strom water drain with Culvert atFrom Velure Road to Kollappatty Housing Board	8	3.36		3.36	16	1.490			2.46

	,Karattuppalayam Burial Ground to Mariyamman Koil,Pannakkadu & Magadevapuram,AKE 1st & 10 street,SND to Ambethkar nagar Road,Namakalroad to Jansons Road Road,Amman Kulam Road,Konku mandapam South side Road . In ward No:30,31,28,22,21,22,18,28									
4	Providing BT Road and Strom water drain with Culvert at Sanarpalayam nadar theru cross street & Mariyamman koil road,CHB Colony Cross street,Malai kavalar koil opposite road,East car street, Puthu Mugamathiyar street,Muniyappan koil Road,Veera ragava muthaliyar street,Kollappatty Housing Board & Kathir Eye Hospital Opposite side road . In ward No:29,27, 26&27,24,20,32,23,28&30.	8	3.30		3.30	16	1.400			2.54
	Total	31	13.54	0	13.54	64	5840		0	10.00
Rasipuram Municipality										
1	Providing BT Road at west cvolony , Kumarasamy Street, Sivan Koil street, EB Colony , Indra colony , Providing CC road at Kumarasamy Lane and Sivan koil street in Rasipuram Municipality	7	2.03	0.127	2.16	4		1.667	0	2.00
2	Providing BT Road at Sivanandha salai (Angels colony Vidiyanigethan school back side), Singan lane, valappa street, MSP Subraya street, ERA Ramalingam Street, Anumanth astreet, Providing CC Road at Mutthusamy street, Annamar street, Sandu veeri street in Rasipuram Municipality.	8	1.614	0.459	2.07	5		2.245		2.00
3	Providing BT Road at Vallar salai, Subramaniyam nagar , Kesavan layout, Vaithiyalingam street, Ramasamy Street No 1,2,3,4 and Providing CC Road at Kamatchi amman koil street, Amaichar Govintha samy street, in Rasipuram Municipality.	6	1.882	0.44	2.32	5		5.425		2.00
4	Providing BT Road at Housing Board road , Weaver's colony ,	7	2.325	0.305	2.63	1		2.225		2.00

	Ellappa colony , Koneripatty Ex.no 2, Mettukadu road, Kamaraj colony (Koneripatty) and Providing CC Road at Koneripatty Ex.no 1, in Rasipuram Municipality.									
5	Providing BT Road at Marappan Thottam (EB Office Road), V.Nagar Road No2,3,9,10 and Providing CC Road at Subraya street, Nanjappa Street, Angalamman KoilStreet, Sekkadi Street in Rasipuram Municipality.	9	1.64	0.521	2.16	6		2.401		2.00
6	Providing BT Road at Thattankuttai Road, Kamaraj Nagar, Angalamman Koil kattur Road, and Providing CC Road at Malli Street in Rasipuram Municipality.	4	2.14	0.262	2.4	4		2.092		2.00
	Total	41	11.63	2.114	13.7	25		16.055	0	12.00
Erode Corporation										
1	Restoration of Damaged B.T Road at Rayapalayam pudur, Sengunthapuram vaikkal road, Palakattur to verapannadiur link road and kumilamparapu in ward no.1,3&4	4	3.13		3.13					0.92
2	Restoration of Damaged B.T Road at Revenue colony and Edukha street (hospital road) in ward no.4&6 and in Su ka valasu main and cross street in ward no:8	13	3.04		3.04					0.825
3	Restoration of Damaged B.T Road at Kamala nagar cross street and Ramamoorthi nagar main and pd shop road in ward no:12&14	12	2.14		2.14					0.755
4	Restoration of B.T Surface at Gangapuram NH to School and Mariamman Kovil to NH junction main roads In ward No-16 and P P Garden main and cross roads In ward No-18 .	19	2.56		2.56					0.94
5	Restoration of B.T Surface at Nallithottam main and cross roads In ward No-19 and Subramaniya siva street, Thilagar street, Kothukarar street, Kongu Nagar and Bankkarar street in ward No-20 .	16	2.82		2.82					0.85
6	Restoration of B.T at Muthusamy street,Nehru street,	15	2.13		2.13					0.71

	Agilmedu 2nd street, Brindha street, velusamy street, Viram Street, West,east & South Hanumantharaiyan Kovil street, West perumal kovil street, East perumal kovil street, Nali Hospital Road, Velli Street, Pavalam Street, Seerangam Street in Ward NO: 24,27,26									
7	Restoration of B.T Road at Ondikaran palayam main Road ward no-31,Golden City Cross Streets, Madikarar colony Cross Street, Nasiyanur road cross street in ward no -32	11	2.27		2.27					0.83
8	Restoration of B.T Road at Muthampalayam pond approach road ward no-34,Annaikattu cross street, Palayapalayam opp ration shop cross street, IndharaGandhi Street II in ward no -35, Sathyamoorthi street, Thiruvalluvar street and Pandian street in ward no -38, West ambethkar street and thiru vee kaa cross streets in ward no -39	15	1.94		1.94					0.87
9	Restoration of B.T Road at Kamaraj street-1,2,4,5,6, Kasthuri bhai street, Valliammai street in ward no-40, Power house road ward no -43,Periyar Nagar E-block main road	9	1.70		1.70					0.80
10	Restoration Of B.T Surface at Kollampalayam Hu Tamil Nagar, Vagai Nagar, Kuppusamy Colony, Tamil Nagar,Vip Thamarai Nagar, Golden Villa Street & Gandhiji St 2 In W.No:50.	11	3.29		3.29					0.90
11	Restoration Of B.T Surface at Puthukalli Valasu In W.No:47,Ats Hospital Road, Indira Gandhi Street, Thilagar Street, Annadurai Street, Avinasi Gounder Street & Thiru.Vee.Ka Street In W.No:49.	10	2.61		2.61					0.70
12	Restoration Of B.T Surface Damaged at Valayakkara Street In Ward No 55, Agathiyar Street, Kamatchikadu, Ss Layout, VVCR Nagar 2nd Street, Ayyanarappan Kovil Street, Radhakrishnan Street And Marimuthu Street In Ward No 56, Molagoundanpalayam In Ward No 60.	11	2.66		2.66					0.90

		146	30.29		30.29					10.00
Tiruppur Corporation										
1	Relaying of BT Surface Road at Pattalamman Kovil Street in Ward No:01,Construction of Storm Water Drain, Culvert & Relaying of BT Surface at Chettipalayam and Cross Streets in Ward No.03,Relaying of BT Surface at Velan Nagar Main Road, 3rd Street & 4th Street in Ward No.04,Construction of Storm Water Drain , Retaining wall and Relaying of BT Surface at Sowbhagya Nagar, Kuberapuri Main Road and Cross Streets in Ward No.05,Relaying of BT Surface Road at Kalaimagal School Street in Ward No:06,Renewal of BT Srface Road at Karupparayan Kovil Street in Ward No:06,Construction of Storm Water Drain, Culvert & Relaying of BT Surface at Srinivasa Layout and Cross Streets in Ward No.07,Renewal of BT Srface Road at Thiruvalluvar Nagar in Ward No:08,Renewal of BT Srface Road at Shivan Street in Ward No:08.,Relaying of BT Surface Road at Cheran Nagar in Ward No:09,Restoration of BT Surface Road at Vidya Mandhir School Street in ward no.10,Restoration of BT Surface Road at Amsa Vinayagar Koil Street and Kumaran Street in ward no.11,Relaying of BT Surface Road at Valluvar Street in Ward No : 14,Construction of Strom Water Drain, Culvert and Relaying of BT Surface Road at Vengateshwara Nagar in Ward No : 15.	14	3.79		3.79	5	0.64			2.49
2	Restoration of BT Surface Road at Sowdamman Kovil 1st & 2nd Streets in Ward No.16,Restoration of BT Surface Road at Anna Nagar Elementry School Street and Cholan Nagar in Ward No.17,Restoration of BT Surface Road at May Nagar 1st,	15	4.19		4.19	4	1.04			3.06

	2nd, 3rd, 4th & Cross Streets and JJ Nagar in Ward No.18,Restoration of BT Surface Road at avinashi Nagar ration shop street in Ward No.20,Formation of BT Surface Road to Roja Nagar 2nd street in Ward No.21,Restoration of BT Surface Road and construction of SWD and culvert at Pappannan nagar north in Ward No.22,Relaying of BT Surface Road to Kumarasamy Layout in Ward No.23,Formation of BT Surface Road to Om Sakthi Kovil Cross street in Ward No. 24,Relaying of BT Surface Road to Ramaiya Colony west 1st, 2nd and Cross street in Ward No.25,Relaying of BT Surface Road to Kannagi Nagar 2nd street in Ward No.26,Relaying of BT Surface Road to Thiruneelakandapuram 1st street in Ward No.27,Formation of BT Surface and Construction of Storm Water Drain at Chinnabomanaikkanpalayam East Road in Ward No: 28,Restoration of BT Surface and Construction of Storm Water Drain at Lakshmi Nagar 1st,2nd Streets in Ward No: 29,Restoration of BT Surface and Construction of Storm Water drain at Ganga Nagar Main Road in Ward No: 30,Formation of BT Surface and Construction of Storm Water Drain at Ponnusamy Nagar 3rd cross street in ward no - 33.									
3	Construction of Strom Water Drain, Culvert and Formation of BT Surface Road at kannagi Nagar in Ward No : 13,Construction of Strom Water Drain, Culvert and Relaying of BT Surface Road at Sathiya Nagar in Ward No : 13,Restoration of BT Surface at V.G.V. Garden Main Street in Ward No. 34,Restoration of BT Surface at MRG Nagar 1st street, 2nd street, 3rd street, North south main road and East west main road in Ward No. 38,Restoration	8	4.202		4.202	7	0.34			4.29

	of BT Surface at Serankadu Main Road in ward no : 41, Renewal of BT Surface to Muthusamy street in ward no.47, Renewal of BT Surface to Nehru street in ward No.48, Restoration of BT Surface at KTC School Main Road (From Chellam Nagar 4 Road to KVR Nagar Police Station) in Ward No. 56.								
4	Restoration of BT Surface at Ponkivil Nagar 1st, 2nd, 3rd, 4th and 5th cross streets in Ward No. 36, Formation of BT Surface at Kannan Nagar 1st, 2nd and 3rd streets in Ward No. 37, Restoration of BT Surface at Kallangadu Nall Road to Veerapandi New Bridge in Ward No. 52, Restoration of BT Surface at Kurunji nagar (Palladam road junction to Veerapandi road Junction) in Ward No. 54, Restoration of BT Surface Prabhu nagar main road and Raja street, Formation of BT Surface at Prabhu nagar 1st, 2nd, 3rd, 4th cross streets and Construction of SWD and Rcc Culvert at Prabhu nagar main road, Cross street in ward no.57, Formation of BT Surface at Royal Gardern, Shanthi nagar 3rd street in Ward No.58, Formation of BT Surface at Kurunji Nagar 1st & 2nd Cross Street in Ward No.59, Restoration of BT Surface at Kulathuputhur 1st and, 2nd Streets in Ward No.60.	9	3.056		3.056	1	0.11		2.00
		46	15.238	-	15.238	17	2.13		11.84
Avadi Corporation									
1	Providing BT road at Ramakrishna nagar Sivanna Chowdry street in Ward no 3, Providing BT road at Ashok Nagar extn Angalaparameshwari amman koil street in Ward no 6, Providing CC road at Annai Therasa Nagar in Ward no 7, Providing BT road at Thirumalai Nagar Pothigai street, Kamar street, VOC street, Vallar street	4.00	1.80	0.50	2.30		-		2.00

	in Ward no 7								
2	Providing BT road at Thendral Nagar East 18th street in Ward no 8, Providing BT road at Thendral Nagar 17th street in Ward no 8, Providing BT road at Brindhavanam street in Ward no 8, Providing BT road at Manikandapuram Area in Ward no 9, Providing CC road at Ishwariya garden in Ward no 9, Providing CC road at Border street in Ward no 13	6.00	1.24	0.65	1.89	-			1.97
3	Providing CC road at Sivasakthi Nagar 'A' sector in Ward no 14 Providing BT road at Konambedu Pillaiyar Koil cross street and Rajiv Gandhi street in Ward no 15, Providing BT road at Lakshmipuram main and 1st street in Ward no 16	3.00	1.15	0.75	1.90	-			1.98
4	Providing CC road at Vasantham nagar extension Kurinji, mullai, lotus and chinna samy street in Ward no 17, Providing CC road at Podhigai Nagar main and cross street in Ward no 17, Providing CC road at Rajbai Nagar Extn 4th street in Ward no 17, Providing BT with SWD at TNHB Women police station road in Ward no 18, Providing CC road at Ranganathan nagar in Ward no 19	5.00	0.35	1.14	1.49	0.35			1.55
5	Providing BT road at kamaraj nagar 3rd street in Ward no 29, Providing BT Road at BOD street in Ward no 43, Providing BT road at kamaraj nagar 4th street (from Lucky store to Periyar nagar PHC) in Ward no 27	3.00	1.46	0.00	1.46	-			1.93
6	Providing BT road at Kamaraj nagar 4th street (from kamaraj main road to Lucky store junction) in Ward no 29, Providing Cement Concrete road at Karunanithi 1st street.. in Ward no 33, Providing BT road at Kavrapalaiyam Kanaka rosi street,JJ Nagar,Bajanai Koil Street and Burial Ground Main Road.. in Ward no 35	3.00	1.00	0.42	1.42	-			2.00
7	Providing CC road at Sindhu Nagar Bavani street, Godhavari	4.00	1.28	0.50	1.78	-			1.65

	Street, Krishna Street, Church Street in Ward no 35, Providing BT road at Balaji nagar Thirupavai & cross street and Thiruvassagam 4th cross street. in Ward no 36, Providing BT road at Lakshmi Nagar Sampurna Arul 1st to 5th cross, pattu street in Ward no 36, Providing BT road at Saibaba koil street and East gopalapuram in Ward no 39									
8	Providing CC Road at Defence Colony Cross Street in Ward no 46, Providing CC Road at Periyar Street in Ward no 47, Providing BT Road at Hawa nagar gandhi street in Ward no 48, Providing BT Road at Venkateshwara Nagar Area Cross Street in Ward no 48, Providing BT Road at Bharathiyar Street & ICF 1st Street in Ward no 48	5.00	1.31	0.62	1.93		-			1.93
	Total	33.00	9.59	4.58	14.17	0.00	0.35	0.00	0.00	15.00

Budget is to be included by the contractors to implement the Environmental Management Plan.

Figure 2.1 Model – Cross Section of Proposed Road -1

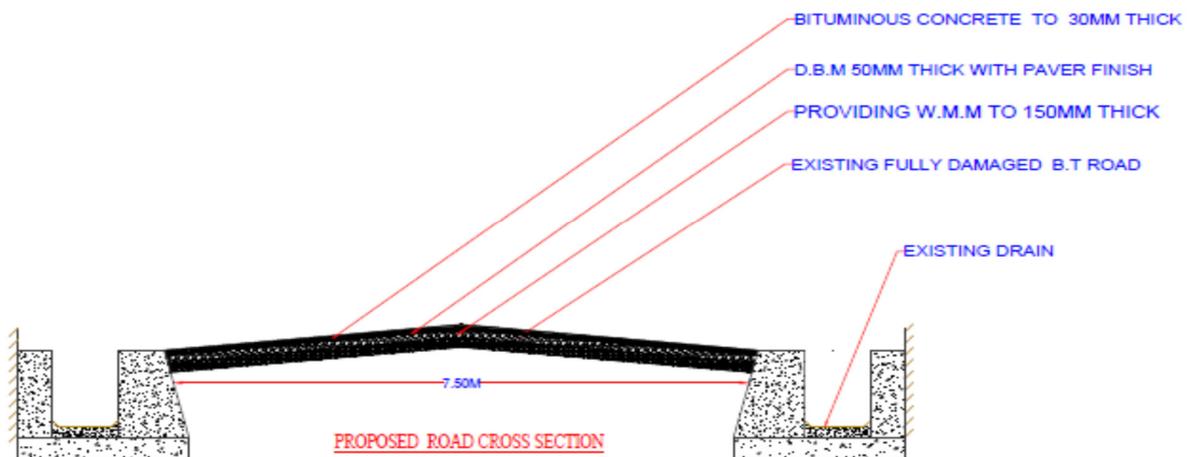


Figure 2.2 Model – Cross Section of Proposed Road-2

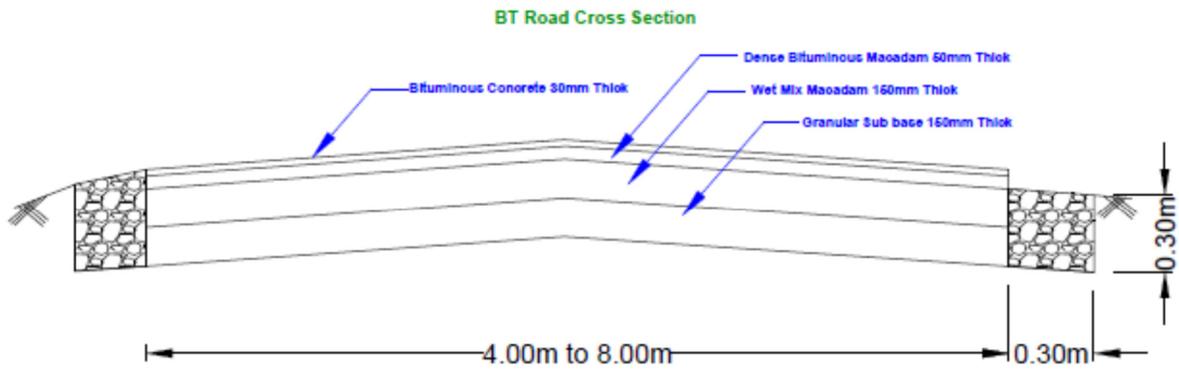


Figure 2.3 Model – Cross Section of Proposed Road with Drain

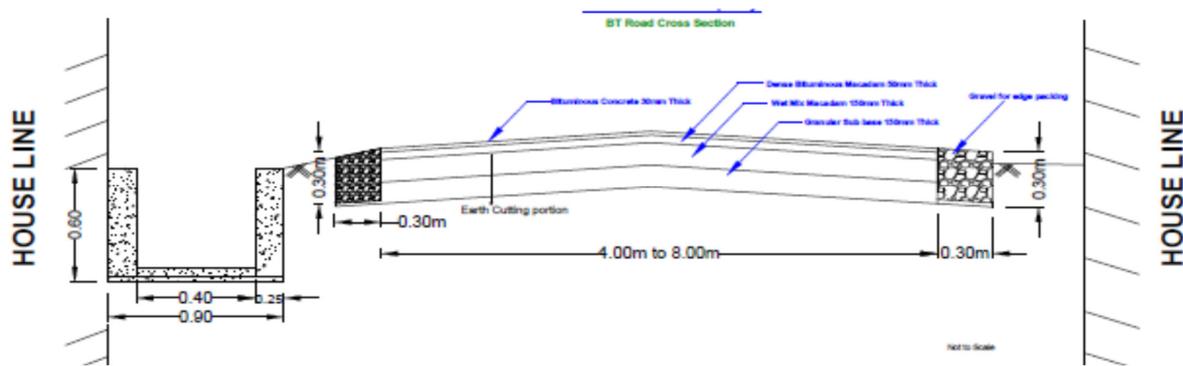


Figure 2.4 Model – Cross Section of Proposed Culvert

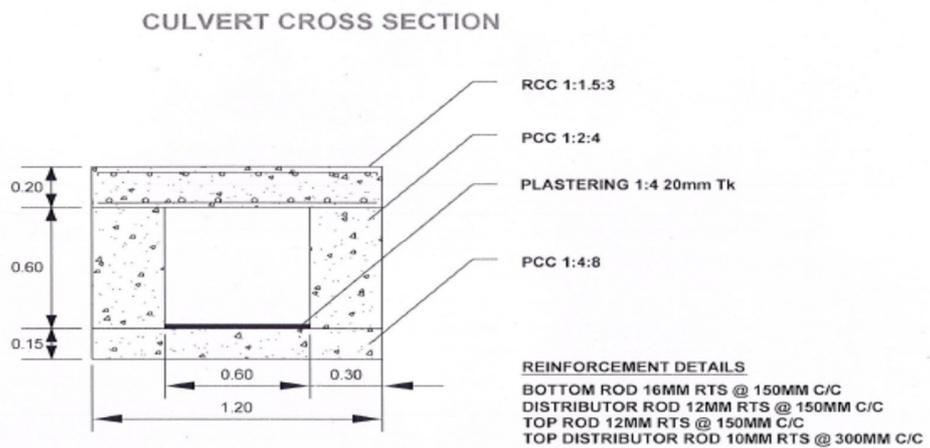
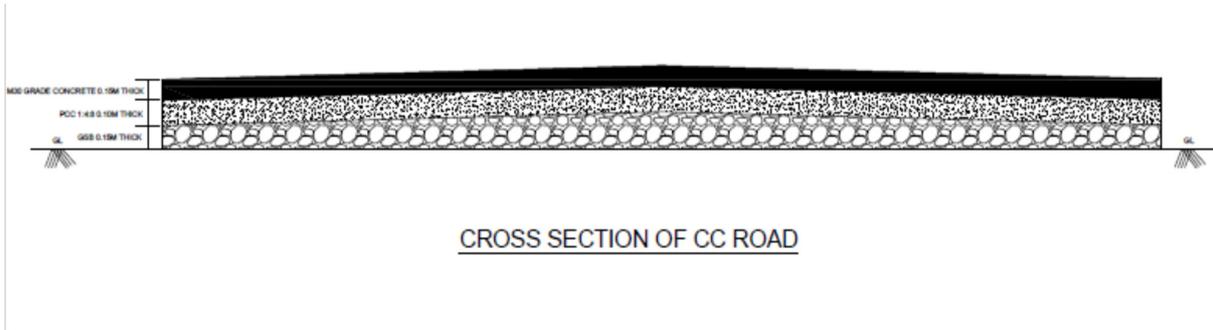


Figure 2.5 Model – Cross Section of Proposed CC Road



CROSS SECTION OF CC ROAD

3 Regulatory Framework

This section provides a review of the various national, state, regional and World Bank environmental laws, rules and regulations relevant to the proposed sub-project and the permits /clearances required from authorities for implementation of the project.

Table 3.1 Review of Regulatory Framework and Applicable Permissions

S.No	ACTS	Relevance to Projects
	NATIONAL	
1.	Environment (Protection) Act, 1986	<p>This law is intended to protect and improve overall environment and essentially links pollution & natural resource issues. This Act empowers the Government of India to make rules to regulate environmental pollution by stipulating standards and maximum allowable limits to prevent air, water, noise, soil and other environmental pollutants. Empowered by the EP Act, the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India has issued various notifications such as Hazardous Wastes (Management & Handling) Rules, 1989; Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989; Noise Pollution (Regulation and Control) Rules, 2000; Environmental Impact Assessment Notification, 2006 etc.</p> <p>It is an umbrella legislation and various notifications, rules & schedules are promulgated under this act. Hence is applicable.</p>
2.	EIA Notification, dt 2006 (S.O.1533(E), dt.14/09/2006)	<p>The notification specifies that prior environmental clearance is required for the projects listed in the schedule of the notification. The Schedule of the notification lists eight broad categories of projects that require prior environmental clearance. These projects are categorized in to Category 'A' and category 'B' based on the magnitude and environmental impacts of the project. Clearance is to be obtained from Ministry of Environment, Forests and Climate Change for Category A projects and from the State Environment Impact Assessment Authority (SEIAA) for Category 'B' projects.</p> <p>The proposed project does not fall under the purview of the notification and hence environmental clearance from MOEFCC is not required.</p>
3.	Wildlife Protection Act, 1972	<p>This Act seeks to protect wildlife, by creating protected areas and controlling trade in wildlife products. Project activities that cross over into protected area regimes then requisite permission must be</p>

		<p>obtained.</p> <p>None of the project roads attract the provisions of the Act and hence not applicable.</p>
4.	Forest (Conservation) Act, 1980	<p>Forest (Conservation) Act, 1980 was enacted to check rapid deforestation and restricts de-reservation of forest land for non-forest purposes. Projects with activities falling in forest areas need a prior Forest Clearance.</p> <p>The project roads do not fall under forest area and hence the act is not applicable for the project.</p>
5.	Water (Prevention And Control of Pollution) Act, 1974 and Tamil Nadu Water (Prevention And Control of Pollution) Rules, 1974	<p>These laws seek to control pollution of water and enhance the quality of water. Under this law, it is mandatory to obtain consent for discharge of effluents and pay consent fees to Tamil Nadu State Pollution Control Board (TNPCB) for any municipal projects causing water pollution.</p> <p>Establishment of Batch Mixing Plants for construction require consent from TNPCB.</p>
6.	The Water (Prevention And Control of Pollution) Cess Act, 1977	<p>This Act provides for levy and collection of a cess by local authorities on water consumed by persons or industries to augment resources for Pollution Control Boards.</p>
7.	Air (Prevention and Control of Pollution) Act 1981 and Tamil Nadu Air (Prevention of Control of Pollution) Rules 1983	<p>These laws address the prevention and control of air pollution. Under section 21 of this Act, it is mandatory to obtain consent from Pollution Control Board to establish or operate any industrial operation.</p> <p>Activities involving emission of pollutants like establishing batch mixing plants require consent from TNPCB.</p>
8.	The Noise Pollution (Regulation and Control) Rules, 2000	<p>The ambient air quality standards in respect of noise for different areas/zones namely industrial, commercial, residential or silence areas/zones are specified in the Schedule of these rules. An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared as silence area/zone as per these rules. The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.</p> <p>The standards prescribed shall be complied with during construction.</p>
9.	Hazardous and Other Wastes (Management, and Transboundary Movement) Rules, 2016	<p>This rules prescribes sound management of hazardous and other wastes, indicates stringent approach for it, recycle and reuse aspect of other wastes, and necessity of infrastructure and mandates authorisation for such facilities from State Pollution Control Board.</p> <p>Projects attracting these rules will have to follow the guidelines for</p>

		handling, transportation and disposal of hazardous wastes.
10.	Public Liability Insurance Act, 1991	According to this notification, all the Major Accident Hazard (MAH) units handling chemicals in excess of the threshold quantities referred to in the MSIHC Rules, 1989 are mandated to take an insurance policy and deposit an equal amount in the Environment Relief Fund (ERF) to ensure immediate payment to the chemical accident victims.
11.	Fly Ash Notification, 1999	This notification necessitates use of flyash for various construction activities like brick manufacturing, road projects etc within 100km radius of thermal power stations.
12.	Solid waste (Management & Handling) Rules 2016	This rules by Ministry of Environment and Forest lays down the methods of handling Solid Waste (MSW) and its scientific disposal. Establishing a facility for disposal requires authorisation from State Pollution Control Board. Provisions of the rules are applicable for the waste generated from the project activities.
13.	Construction and Demolition Waste Management Rules, 2016	This rules prescribes safe disposal and management of construction and demolition wastes. The wastes generated from the project during construction shall be in compliance with the rules.
14.	Wetlands (Conservation and Management) Rules, 2010	The rules lists list of wetlands that needs to be protected like those covered under Ramsar Convention, those in UNESCO heritage site, those which are ecologically sensitive etc and prohibits the following activities within such wetlands: <ul style="list-style-type: none"> • Reclamation of wetlands • Setting up of new industries and expansion of existing industries • Manufacture, storage, handling or disposal of hazardous substances • Solid waste dumping • Discharge of untreated effluents • Any permanent construction except boat jetties • Any other activity affecting ecosystem of the wetland The project proposes improvements to the existing roads and the rules not applicable for the project.
15.	E-Waste (Management) Rules, 2016	The rules prescribe procedures for manufacture, collection, dismantling, recycling, and disposal of electronic wastes and requires authorisation of the State Pollution Control Board for the same. Manufacturer, dealer, refurbisher and Producer responsibility Organization (PRO) have been introduced as additional stakeholders in the rules. Compact Fluorescent Lamp (CFL) and other mercury containing lamp brought under the purview of rules.

16.	Coastal Regulation Zone (CRZ) Notification, 2011	This notification under Environment (Protection) Act, 1986 supplements the law on site clearance by declaring certain zones as CRZ and regulates activities in these zones. The CRZ Notification, 2011 clearly lists out the areas that fall within the categories of I, II, III and IV of CRZ-I and the permissible and non-permissible activities in each zone. The main objectives of the Coastal Regulation Zone Notification, 2011 are to ensure livelihood security to the fishing communities and other local communities living in the coastal areas; to conserve and protect coastal stretches and; to promote development in a sustainable manner based on scientific principles, taking into account the dangers of natural hazards in the coastal areas and sea level rise due to global warming. None of the project proposed fall under the purview of the notification and hence CRZ clearance is not required.
17.	Plastic Waste Management Rules 2016	This rules provides guidelines for manufacturer of plastic bags with respect to thickness (from 40microns to 50 microns), expands the jurisdiction from municipal to rural areas, brings in responsibility of producers and waste generators, promotes use of plastic waste in road construction and prohibits availability to consumers free of cost. Further, these rules lay the responsibility of disposal of these wastes in scientific manner with the municipalities/ urban local body.
18.	Tamil Nadu Groundwater Development and Management Act 2000	The Act intends to regulate and control ground water extraction for various purpose.
	Project Activity	
19.	Road improvement works	Nil. The proposed roads are under the ownership of respective ULBs and none of them fall under the purview of other departments and hence permissions from other departments are not envisaged.
	STATE LEVEL	
	OPERATIONAL POLICIES AND DIRECTIVES OF THE WORLD BANK	
20.	OP/BP 4.01 - Environmental Assessment	Operational Policy 4.01 (OP 4.01) is one of the ten safeguard policies of the World Bank, which provides the Environmental Assessment (EA) guidance for the lending operations. The OP 4.01 requires the borrower to screen projects upstream in the project cycle for potential impacts. Thereafter, an appropriate EA approach to assess, minimize / enhance and mitigate potentially adverse impacts is selected depending on nature and scale of project. The EA needs to be integrated in the project development process such that timely measures can be applied to address identified impacts. The policy requires consultation with affected groups and NGOs to recognise

		community concerns and the need to address the same as part of EA.
21.	OP 4.11- Physical Cultural Resources	<p>The World Bank’s Operational Policy 4.11 aims at preserving and avoiding the elimination of structures/ natural features and landscapes having archaeological (prehistoric), paleontological, historical, religious and unique natural values. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people’s cultural identity and practices and the Bank will in turn assist to mitigate impact and for protection and enhancement of physical cultural resources encountered in the project.</p> <p>Wherever, projects to be funded by TNUDF involve physical cultural resources or in case of any chance finds, suitable mitigation / management plan will be prepared within the Environmental Assessment and implemented as part of the project.</p>
22.	OP 4.04 - Natural Habitats	<p>Operational Policy 4.04 sets out the World Bank’s policy on supporting and emphasising the precautionary approach to natural resource management, take into account the conservation of biodiversity, and ensure opportunities for environmentally sustainable development. As per this policy, projects that involve significant conversion or degradation of critical natural habitats are not supported by the Bank.</p> <p>Projects involving non critical habitats are supported if no alternatives are available and if acceptable mitigation measures are in place.</p> <p>The roads proposed for improvements are located within the developed urban areas and do not run through or affect any natural habitat. Hence the policy is not triggered.</p>
23.	OP 4.36 - Forests	<p>Forest Policy (OP/BP 4.36) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development for protection of forests through consideration of forest related impacts of all investment operations, ensuring restrictions for operations affecting critical forest conservation areas, and improving commercial forest practice through use of modern certification systems.</p> <p>The proposed project does not involve any forest land and policy is not triggered.</p>

List of permissions required:

Table 3.2: Key Statutory Clearances to be obtained

Sr. No.	Clearance/ Consents Requirement	Statute under which clearance/permission is required	Statutory Authority	Obtained By	Supervision By
1.	Tree cutting	Tamil Nadu Timber Transit Rules, 1968 or latest	Revenue Department	Contractor & ULB	ULB
2.	Borrow Area for Sand and Earth	EIA Notification, 2006 and subsequent amendments there after	DEIAA/SEIAA	Agency concerned (to be verified by Contractor)	ULB
3.	Stone Quarry	EIA Notification, 2006 + Mines and Minerals (Development and Regulation) Amendment Act, 2015	DEIAA/SEIAA + Department of Mines	Agency concerned (to be verified by Contractor)	ULB
4.	Hot mix plant, Crusher and Batch Mix Plant	Air (Prevention and Control of Pollution) Act, 1981 & Water (Prevention and Control of Pollution) Act, 1974	TNPCB	Contractor	ULB
5.	Storage, Handling and Transport of Hazardous Wastes	Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016	TNPCB	Contractor	ULB
6.	Storage and Handling Fuel/Oil (such as Diesel)	Manufacture, Storage and Import of Hazardous Chemicals (Amendment) Rules, 2000	Chief Controller of Explosives	Contractor	ULB
7.	Permission for Withdrawal of Groundwater for Construction	Guidelines to Regulate and Control Ground Water Extraction in India, 2019	PWD (WRD)	Contractor	ULB
8	Traffic Management and Regulation during construction and maintenance	National Road Safety Policy + Guidelines of Indian Roads Congress	Traffic Police Department and ULB	Contractor	ULB

In addition to the above, major labour laws applicable to establishments engaged in building and other construction works are as indicated below.

- (i) Workmen Compensation Act, 1923
- (ii) Employees Compensation Act 1923
- (iii) Payment of Gratuity Act, 1972

- (iv) Employees P.F. and Miscellaneous Provision Act, 1952 (since amended)
- (v) Maternity Benefit Act, 1961
- (vi) Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013
- (vii) Contract Labour (Regulation & Abolition) Act, 1970
- (viii) Minimum Wages Act, 1948
- (ix) Payment of Wages Act, 1936
- (x) Equal Remuneration Act, 1976
- (xi) Payment of Bonus Act, 1965
- (xii) Industrial Disputes Act, 1947
- (xiii) Trade Unions Act, 1926
- (xiv) Child Labour (Prohibition & Regulation) Act, 1986
- (xv) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act, 1979
- (xvi) The Occupational Safety, Health and Working Conditions Code, 2020
- (xvii) The Building and Other Construction Workers (Regulation of Employment and conditions of Service) Act 1996 and the Building and Other Construction Workers Welfare Cess Act, 1996 (BOCWW Cess Act)
- (xviii) Factories Act, 1948
- (xix) Weekly Holidays Act, 1942
- (xx) Bonded Labour System (Abolition) Act, 1976
- (xxi) Employer's Liability Act, 1938
- (xxii) Employees State Insurance Act, 1948
- (xxiii) The Personal Injuries (Compensation Insurance) Act, 1963
- (xxiv) Industrial Employment (Standing Order) Act, 1946

4 Baseline Environment:

The project areas are spread across the state of Tamil Nadu. The project involves 3 Municipal Corporations and 6 Municipalities, which are characterized by high urban development. The collection of baseline information on physical, biological and socio-economic aspects of Tamil Nadu have been from secondary sources and are provided below.

Physical Environmental:

4.1.1 Geography

Tamil Nadu covers an area of 130,058 km² (50,216 sq mi), and is the tenth-largest state in India. The bordering states are Kerala to the west, Karnataka to the north-west and Andhra Pradesh to the north. To the east is the Bay of Bengal and the state encircles the union territory of Puducherry. The southernmost tip of the Indian Peninsula is Kanyakumari which is the meeting point of the Arabian Sea, the Bay of Bengal, and the Indian Ocean.

The western, southern, and the northwestern parts are hilly and rich in vegetation. The Western Ghats and the Eastern Ghats meet at the Nilgiri Hills. The Western Ghats traverse the entire western border with Kerala, effectively blocking much of the rain-bearing clouds of the south-west monsoon from entering the state. The eastern parts are fertile coastal plains and the northern parts are a mix of hills and plains. The central and the south-central regions are arid plains and receive less rainfall than the other regions.

Tamil Nadu has the country's third-longest coastline at about 906.9 km (563.5 mi).^[53] Pamban Island and a group of smaller limestone shoals make up the northern portion of Adam's Bridge, which was formerly a natural bridge linking India with Sri Lanka. Tamil Nadu's coastline bore the brunt of the 2004 Indian Ocean tsunami when it hit India, which caused 7,793 direct deaths in the state. Tamil Nadu falls mostly in a region of low seismic hazard with the exception of the western border areas that lie in a low to moderate hazard zone; as per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu falls in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

4.1.2 Climate and Rainfall

The climate of the state ranges from dry sub-humid to semi-arid. The state has two distinct periods of rainfall:

- South west monsoon from June to September, with strong southwest winds;
- North east monsoon from October to December, with dominant northeast winds;

The annual rainfall of the state is about 945 mm (37.2 in) of which 48 per cent is through the northeast monsoon, and 32 per cent through the southwest monsoon. Since the state is entirely dependent on rains for recharging its water resources, monsoon failures lead to acute water scarcity and severe drought.[55] Tamil Nadu is divided into seven agro-climatic zones: northeast, northwest, west, southern, high rainfall, high altitude hilly, and Kaveri Delta (the most fertile agricultural zone).

4.1.3 Geology:

Tamil Nadu has varied geological rock formations and geomorphological features. The rock formation in Tamil Nadu includes Khondalite, Charnockite, Granite, Gondwana, etc. These rock formations contain major minerals such as Limestone, Magnesite, Graphite, Vermiculite, Bauxite, Iron ore, Lignite, Monazite, Garnet, Sillimanite, Rutile, Zircon, Ilmenite, Leucosene, minor minerals such as Black Granite, Multi Coloured Granite, Clay, Gypsum, Silica Sand, Quartz, Feldspar and mineral oils such as Petroleum and Natural Gas. Kollihills in Namakkal district contain good deposits of Bauxite. Graphite occurs mainly in Sivaganga and Madurai districts.

Granites occurs in two different types namely Black and Coloured Granite. Black Granites geologically known as Dolerite predominantly occurs as dyke in the districts of Kanchipuram, Vellore, Tiruvannamalai, Villupuram, Dharmapuri, Krishnagiri, Salem and Erode. Coloured Granites occur in Madurai, Dharmapuri, Krishnagiri, Virudhunagar, Pudukkottai, Salem, Karur and Namakkal. The rock types Fuchsite Quartzite, Garnetiferous Quartzite, Magnetiferous Quartzite and Kyanite Quartzite are found in the districts of Erode, Namakkal, Karur and parts of Salem. Gneisses, metamorphosed rocks mainly found in the areas of Gobichettipalayam and Bhavani Sagar. Garnet Sillimanite Gneiss, Quartzite, Calc-Granulite, Crystalline Limestones are distributed in the Western Ghats of Southern Granulite Terrain.¹

¹<https://www.tnmines.tn.gov.in/>

Biological Environment

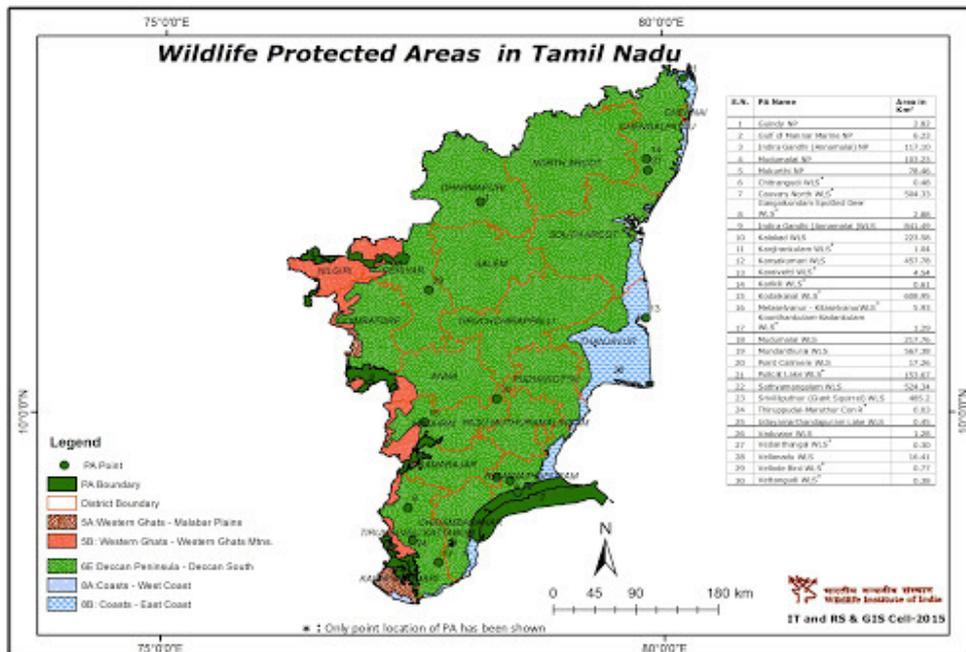
The most common trees found in Tamil Nadu include *Azadirchta Indica* (Neem), *Pongamia Pinnata* (Pungai), *Tamarindus indica* (Tamarind), *Thespesia populnea* (Poovarasu), *Borassus flabellifur* (Palm), *Ficus racemose* (Fig), *Ficus benghalensis* (Banyan), *Mangifera indica* (Mango), *Erythrena vaiegata* (Indian Coral), *Saraca Ashoka* (Ashoka), *Cassia fistula* (Golden Shower), *Moringa oleifera* (Murunga), *Polyalthia longifolia* (False Ashoka), *Artocarpus heterophyllus* (Jackfruit), *Cocos nucifera* (Coconut), *Couroupita guianensis* (Cannonball), etc.

The faunal species predominantly encountered in urban areas include the domestic cattle, cats and dogs, common snakes, lizards, crows, parakeets, squirrels, sparrows, pigeons, common babblers, mynas, etc

Wildlife and Protected Areas

Tamil Nadu has total protected area of 7,072.95 sq. km. which comes to 30.92% of the State's Forest area. The Protected Areas in the State includes 5 National parks, 15 Wildlife sanctuaries, 15 bird sanctuaries and 2 conservation reserves besides 4 Tiger Reserves viz. Anamalai, Kalakkad - Mundanthurai, Mudumalai and Sathyamangalam. These Protected Areas have been established under Wildlife (Protection) Act, 1972. Further Tamil Nadu also has the distinction of having 3 Biosphere Reserves viz. Nilgiris, Gulf of Mannar and Agasthiarmalai, which are internationally acclaimed for their rich and unique biodiversity²

²<https://www.forests.tn.gov.in/>



Cultural Environment

Tamil Nadu has many temples which are ancient, renowned for architecture & sculptures and are of religious and tourist importance like Meenakshi Temple in Madurai. There are about 242 monuments protected by Archaeological Survey of India, Thanjavur Brihadeeswarar temple, Shore temple in Mamallapuram, Siva Temple in Trichy, Narasimhaswamy Temple in Namakkal and Vellore Fort in Vellore.

Project location specific environmental features

All the ULBs have submitted their environmental screening report followed by the screening format discussing in detail the proposed project and activities, features in the project area etc. The screening reports are attached in the Annexure 1.

There are developments close to the roads including residences, schools, hospitals etc. Many of the roads provide connectivity to religious places and commercial developments. In some towns, there are waterbodies present near the roads taken up for improvements.

5 Environmental Impact Assessment

Impact on Physical Environment:

The improvements are proposed for existing roads and within the existing road right of way. The projects do not involve development of any new roads and hence there is no change in the landuse of the project area.

Road improvements works do not involve any major cutting activity except for excavation for storm water drain construction at select locations which will be negligible. Hence there is no impact on the physical environment.

Impact on Water Environment:

The storm water drains proposed are connected on both sides to the existing road side drains, and are for ensuring continuous flow of drain water. Hence no impact is envisaged on water environment. The improved drainage will prevent stagnation and contribute to overall improvement in environmental conditions.

In project towns like Tambaram, Rasipuram and Avadi, there are waterbodies present near the roads proposed for improvements. The sediment laden run-off, oil spills from the maintenance of the machinery and operation of the diesel generator sets on site, diesel storage and parking places and storage and stock yards of bitumen and emulsion, etc may have negative impact on the quality of the nearby surface water.

Though the activity is restricted to only the existing road width, measures to control running of silt into the nearby waterbodies is to be followed during construction by the contractor.

Impact on Air Environment and Noise:

The air quality is being monitored by TNPCB at 25 different locations in Tamil Nadu under National Air Quality Monitoring Programme (NAMP). According to the data published, the AQI in most locations is GOOD (17 – 46), 2 locations were SATISFACTORY and one location MODERATE with AQI of 131 where the predominant pollutant was PM₁₀³. The levels

³https://tnpcb.gov.in/pdf_2020/caaqms_07_12_20.pdf

of SO₂ ranges from 4 µg/m³ to 16 µg/m³, NO₂ ranges from 7 µg/m³ to 31 µg/m³, PM 10.5 levels between 25 – 249 µg/m³ and PM_{2.5} between 9 and 84 µg/m³.⁴

The proposed improvement to roads are expected to ensure free flow of traffic thereby reducing the emissions due to traffic snarls. However during construction, air may get affected due to construction works and noise levels may rise from operation of machinery which are temporary and are to be mitigated through management measures.

Impact on Biological Environment:

The project roads do not pass through any forest land and no protected areas are near the project roads. Hence no impact on the wildlife or biodiversity is expected from the proposed project.

There may be trees present in the stretches identified for road improvements and storm water drain construction. However, road improvements do not involve any widening and for construction of drains, adequate precautionary measures for the protection of trees are suggested in the Environmental Management Plan. Hence no tree cutting is envisaged in the project implementation.

Impact on Cultural Environment

The project towns have famous temples like Sree Anjaneyar temple and Sri Narasimha Swamy Temple in Namakkal, Ardhanareeswarar Temple in Tiruchengode, Kailasanathar Temple in Rasipuram, Thindal Murugan Temple & Peria Mariamman Temple in Erode, Meenakshi Sundareshwarar Temple in Devakottai, Sundararaja Perumal temple in Paramakudi. The project towns have other religious places like Our Lady of Fatima Church in Tambaram, and mosques, Jain temples, etc which are well-connected by the existing roads. In addition to the above, there are other small religious places near the proposed roads, small installations of God in front of the houses etc which may be affected during construction.

⁴http://tnenvis.nic.in/Database/TN-ENVIS_793.aspx

The proposed improvement works to roads are not envisaged to cause any impact on these features. However, during construction management measures are to be followed to minimize the inconveniences to the users and to ensure safety.

There are no monuments protected by Archaeological Survey of India near the project roads and hence no permission is required for the proposed activity.

Impact on utilities:

The road improvements are proposed within the existing width, hence in such sections no impact is anticipated on utilities. In stretches involving construction of drains, there may be presence of utilities like street lights, EB posts, etc near the alignment which are to be considered during implementation. Further, house services connections for water supply and sewerage lines may also be disturbed. Hence during construction the management measures for shifting of the utilities in co-ordination with the department concerned, immediate rectification of utilities disturbed are to be implemented.

Impact on nearby structures

The construction activity is proposed within the right of way and hence not expected to impact the neighbouring structures. During construction of drains, access to adjacent facilities / landuses will be disturbed temporarily. During construction temporary access is to be provided to the nearby structures.

Traffic impacts

Traffic disruptions and disturbances will be caused due to the construction activity. Hence traffic management through prior planning for roads and sections to be taken up, obtaining intimation /permission from ULB/Traffic Police, making necessary arrangement for traffic & pedestrian mobility are to be ensured during construction.

Generation of Wastes

There will be waste generation during construction stage like the bituminous waste from road improvement works, excess earth from excavation for new drain, construction and

demolition wastes from rehabilitation of existing drains, and other construction wastes. Improper storage or dumping of the wastes in waterbodies or low lying areas will result in affecting the quality of air, water and soil. Hence the wastes generated need to be managed in a proper manner, complying with the provisions of wastes management regulations.

Health and Safety

Health and safety impacts to the labourers involved in construction and communities near work areas/material storage areas. During construction necessary personal protective equipments are to be provided to the labourers. Necessary management measures like barricading, placing reflectors, signages etc are to be followed during construction.

6 Analysis of Alternatives

For assessing and management of environmental issues from project implementation analysis of alternative has been considered for selection of the best alternative with positive benefits and reduces potential negative impacts due to the proposed road improvement project.

Without Project Scenario

The existing roads which are damaged will affect vehicular traffic and result in increased travel time and nuisance. Mobility of the residents will be affected due to poor connectivity. The pedestrians will be put into unsafe conditions due to the poor road conditions. The economic development of the adjacent users will be affected if the road improvements is not taken up. Inadequate drain size, damaged drains and absence of drains will cause stagnation of drain water causing undesirable environmental conditions.

With Project Scenario

This scenario will have improvement to the existing conditions resulting in positive impact. The proposed road improvements will reduce the traffic congestion & travel time, result in improved access and connectivity, and resolve the drainage issues.

Table –6.1 Comparative Assessment of Project Alternatives

Component	Without Project	With Project
Traffic Congestion	Traffic congestion will increase due to damaged roads.	Improvement in travel time, vehicular emissions and better micro-environmental conditions.
Pedestrian safety	In these stretches, pedestrian safety is an issue of concern.	Provides better access avoiding pedestrian and vehicular conflicts.
Land Acquisition	No impact.	No impact.
Drainage	Stagnation issue remains unaddressed without the project.	Drainage will be improved with free flow of storm water.
Access to basic facilities such as Markets, schools, Hospitals etc.	Difficulty in accessing the basic facilities due to heavy traffic.	Easy access to basic facilities due to improved smooth road
Development	Development activities will be greatly hampered by the gross	Higher potential for development due to

	inadequacy of infrastructure.	improvement in connectivity.
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The proposed improvement of roads and storm water drains will result in betterment of the existing environmental conditions and contribute greatly to development in the project areas.

7 Environmental Management Plan:

Management measures are essential for mitigation of the impacts during pre-construction, during construction, and post construction stages. The important management measures that need to be adhered to by the contractor and the ULBs include

- (i) Proper planning of works by the contractors and the ULBs;
- (ii) Arranging required clearances / permits (including for batching plants, use of equipment/vehicles etc.);
- (iii) Prior intimation to residents before start of work and display of project info and emergency contact details on the sites continuously till closure of the project;
- (iv) Providing temporary access to adjacent structures wherever required and reinstate original conditions within the minimum possible duration without causing disturbance and safety issues;
- (v) Providing adequate measures to ensure protection of nearby features like temples, small religiously/culturally important areas, etc;
- (vi) For trees present near the alignment adequate measures for protection of roots and support are to be implemented.
- (vii) In case of any tree cutting, compensatory plantation at ten times the trees cut and their protection shall be ensured by the ULB;
- (viii) Work schedule in consideration of the adjacent sensitive receptors and local festivities
- (ix) Providing necessary PPEs to the labourers;
- (x) Ensuring safe disposal of picked wastes and other construction & demolition wastes and preventing dust and wastes from impacting communities and water bodies/other landuses;
- (xi) Stagger work hours to suit other common uses of facilities nearby to avoid disturbances and ensure safety; stagger work hours depending on school, religious requirements of nearby land uses including festivities, processions etc.
- (xii) Monitoring and managing air emissions & noise levels at sample sites during construction activity;
- (xiii) Co-ordination with traffic department by the contractors and the ULBs to manage traffic disruptions during the construction period. Special consideration near schools, markets with heavy movement and possible conflicts (pedestrian/vehicular);
- (xiv) Procurement of raw material from approved quarries, valid consent for hot mix plants/batch mixing plants are to be ensured prior to start of work;
- (xv) Labour camp & facilities on site to be appropriate / livable and safe;
- (xvi) Secure sites without any access-using hard barricades / screens / night lighting/ reflectors and site barricading so as to avoid any safety issues;
- (xvii) EHS person is to be employed by the contractor throughout the duration of the project to ensure implementation of EHS/ EMP measures and report monthly to ULBs on environmental aspects maintain records of incidents on site;;

(xviii) ULBs to report to TNUIFSL monthly & TNUIFSL to the Bank through Quarterly Reports with photos to enable virtual monitoring;

ENVIRONMENTAL MANAGEMENT PLAN

To ensure the implementation of the environmental safeguards, an Environmental Management Plan for sub-project providing improvements to roads is presented below for adoption as guidelines during different stages of Project Implementation.

These are the minimum requirements and the contractor shall be responsible to familiarize with the requirements and implementation of the mitigation measures as applicable for the sub project and typical conditions thereof.

Table 7.1 Environmental Management Plan

Sl.no	Activities	Management /Mitigation Measures	Responsible Agency	
			Implementation	Supervision
		1.0 PRE-CONSTRUCTION		
1.1	Appointment and Mobilization of Environment & Safety Officer	<ul style="list-style-type: none"> The contractor will appoint qualified and experienced Environment & Safety Officer (ESO), who will be mobilized prior to start of works. ESO will dedicatedly work and ensure implementation of Environmental Management Plan including Occupational, Health and Safety measures during the project implementation. 	Contractor	ULB

1.2	Clearances	<p>All clearance required for Environmental aspects during construction shall be ensured and made available before start of work.</p> <ul style="list-style-type: none"> • For setting-up of Hot Mix Plants, Concrete Mixing Plant, Batching Plant, D.G Sets, Consent to Establish and Consent to Operate will be obtained from Tamil Nadu Pollution Control Board (TNPCB) prior to start of work and conditions be complied. • If contractor intends to procure construction materials from existing units, then the approvals for the concerned units shall be ensured prior to start of work. • The permits obtained by the contractor (including Labour Licence, Labour Insurance, etc) shall be examined by the ULB and validity be ensured. 	Contractor	ULB
1.3	Other construction vehicles, equipment and machinery	<ul style="list-style-type: none"> • All vehicles, equipment and machinery to be procured for construction will conform to the relevant bureau of Indian standard (BIS) norms. • Noise limit for construction equipment to be procured such as compactors, rollers, front loaders, concrete mixers, cranes (movable), vibrators and saws will not exceed 75 dB(A), measured at one meter from the edge of the equipment in free field, as specified in the Environmental (Protection) Rules, 1986. • The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period. • All vehicle shall operate within prescribed speed limits in the city not exceeding 20km/hr in school zones and shall be maneuvered by personnel with valid license & should not be under effects of intoxication while engaged in the project activities. 	Contractor	ULB
1.4	Identification of Quarries	<ul style="list-style-type: none"> • The contractor will procure approved quarries for sourcing of the materials for construction. 	Contractor	ULB
1.5	Water for construction	<ul style="list-style-type: none"> • The contractor shall source construction water preferentially from surface water bodies in the project area. Boring of any tube wells will not be permitted. • To avoid disruption/disturbance to other water users, the contractor shall extract water from fixed locations. The contractor shall consult the local people before finalization the locations and get ULB advice on using sustainable source without causing pollution. 	Contractor	ULB

		<ul style="list-style-type: none"> • Contractor can extract ground water only in case surface water sources are not available and that too only after proper permission from State Groundwater Department and comply with the requirements. • The use of surface water by the contractor shall be allowed only after written permission/consent of the community/panchayat/owner indicating the quantum of water allowed to be drawn. In case of Irrigation sources, consent shall be obtained from the competent authority and any such use shall be informed to the local community in advance. 		
1.6	Labour requirements	<ul style="list-style-type: none"> • Wherever possible, the contractor may use skilled/unskilled labour as required; drawn from local communities. • All applicable labour regulation will be complied by the contractor. Laborer's shall be provided orientation of ESMP requirements and COVID related regulations • Strict adherence to avoid child labour of any form of work should be followed at the construction site and camp sites. 	Contractor	ULB
1.7	Planning Temporary traffic diversion and Pedestrian safety	<ul style="list-style-type: none"> • Temporary diversion will be provided with the approval of the engineer. Traffic management plans will be finalized locally in consultation with the Traffic department and ULB, one week prior to commencement of works. • The traffic management plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of materials and arrangement of flagmen (esp. near key landuses and schools). • Special consideration will be given to the preparation of the traffic management plan and housekeeping / work area management plan for safety of pedestrians and workers at night. • The Contractor will also disclose to the local community about diversion in traffic routes and pedestrian access arrangements with assistance from ULB. Proper signages/info boards shall be arranged prior to works providing emergency contacts etc. 	Contractor	ULB

1.8	<p>Location of Construction of labour camps:</p> <p>Accommodation</p>	<ul style="list-style-type: none"> • Consult ULB before locating project offices, sheds, camps, and construction plants; • Construction camps will not be proposed within 100m from the nearest habitation to avoid conflicts and stress over the infrastructure facilities, with the local community. • Select a camp site away from residential areas (at least 100 m buffer shall be maintained) or locate the camp site within the existing facilities of ULB; • Avoid tree cutting for setting up camp facilities; • Provide a proper fencing / compound wall for camp sites; • Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas; • Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit; • Ensure conditions of livability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as much as possible to use portable ready to fit-in reusable cabins with proper ventilation) and safe materials for all extreme weather conditions; thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers; • Camp shall be provided with proper drainage, there shall not be any water accumulation; • Provide drinking water, water for other uses, and sanitation facilities for employees; • Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities. • Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed; • Train employees in the storage and handling of materials which can potentially cause soil contamination; • Recover used oil and lubricants and reuse or remove from the site; • The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in co-ordination with the 	Contractor	ULB
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		<p>ULB.</p> <ul style="list-style-type: none"> • Where feasible, manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; ULB shall ensure proper segregated storage, collection, transport, treatment and disposal of all wastes following the SWM / C&D waste Rules 2016. • Separate toilets/bathrooms are to be provided for women, wherever required, and shall be screened from those for men (marked in vernacular language) • Adequate water supply is to be provided in all toilets and urinals • All toilets in workplaces are to be cleaned and kept in a strict sanitary condition. • Sewage/Wastewater from the camps shall be disposed properly either into sewer system; if sewer system is not available, provide on-site sanitation with septic tank and soak pit arrangements; • Adequate health care is to be provided for the work force during the entire phase. Inform nearest PHC regarding the work camp & get trainings/ orientations, COVID guidance etc • Remove all wreckage, rubbish, or temporary structures which are no longer required; • At the completion of work, camp area shall be cleaned and restored to pre-project conditions. 		
1.9	HIV/AIDS Prevention Measures	<ul style="list-style-type: none"> • Necessary HIV/AIDS prevention measures will be taken at labour camp. • HIV/AIDS awareness program will be organized by the contractor's Environment & Safety Officer. 	Contractor	ULB
1.10	Stock-yards	<ul style="list-style-type: none"> • Contractor in consultation with ULB shall identify the site for temporary use of land storage of construction materials. These sites shall not cause an inconvenience to local population / traffic movement. • Selection of location for materials storage and equipment lay-down areas must take into account prevailing winds, distances to adjacent land uses, general on – site topography and water erosion potential of the soil. Impervious surfaces must be provided wherever necessary. • Location for stockyards for construction materials will be identified sufficiently from water course and separated from the labour camps. • Proper cover and stacking of loose construction material will be ensured during construction of outfall structures at construction site to prevent surface 	Contractor	ULB

		<p>runoff and contamination of nearby land, water body, nearby storm water drain & underground sewerage pipes.</p> <ul style="list-style-type: none"> • Enclosed storage for fuel with non- permeable flooring, and safety signages. • Inflammable materials shall not be stored near residences/ schools, etc. Contractor shall cover material stockpiles with tarpaulin or other materials. • Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. Necessary training and awareness program shall be carried out to make the labourers aware about hazardous nature of substances. 		
1.11	Fuel storage and refueling areas	<ul style="list-style-type: none"> • The contractor will ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites are not located near rivers and irrigation canal/ponds • All location and lay-out plans of such sites, collection and disposal methods for the spent oil and grease will be finalized in consultation with the Engineer. • Refuelling shall be done in such a fashion that oil/diesel spillage does not contaminate the soil. • Oil and grease traps will be provided at fuelling locations, to prevent contamination of water. 	Contractor	ULB
1.12	Information Dissemination and Communication Activities	<ul style="list-style-type: none"> • Prior to construction activity, information dissemination will be undertaken by contractor at the project site. • Project information Board showing the name of work, project cost, duration, date of commencement, date of completion, executing agency and contact details (including telephone numbers) shall be displayed both sides of the both roads in both English and in Vernacular. • Information boards will also be setup at the sites of construction camps and labour camps, plants and stockyard site. • Details of nodal officer with telephone numbers will be displayed for registering compliant/grievances by stakeholder/general public. 	Contractor	ULB
1.13	Covid 19 control measures	<ul style="list-style-type: none"> • Construction sites operating during the Covid-19 pandemic need to ensure they are protecting their WORKFORCE and minimising the risk of spread of infection. • SOPs and guidelines issued by GOI and GoTN from time to time to prevent 	Contractor	ULB

		spread of Covid19 shall be adhered to during sub-project implementation.		
2.0 CONSTRUCTION STAGE:				
(a) PREPARATORY WORKS				
2.1	Clearance and Grubbing	Only ground cover / shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the engineer. The contractors, in any circumstances will make efforts to protect the trees present near the alignment.	Contractor	ULB
2.3	Tree Protection, Tree Planting,	<ul style="list-style-type: none"> • Giving due protection to the trees that fall in the shoulders /corridor of impact shall be the prime focus during Construction/post construction. This will also include the provision of tree guards for the existing trees near alignment with retro reflective studs on them to facilitate better visibility during night time. Necessary care should be taken to ensure that the construction activities do not disturb the roots, do not impede natural movement or restrict growth. • Minimize tree cutting by proper planning of drains & construction works. • For any tree cutting encountered during construction, compensatory plantation of ten times the number of trees cut should be carried out by the ULB, to the extent possible along the project road or in the nearby areas. ULBs shall arrange to nurture them and monitor till they attain proper growth. 	Contractor	ULB
2.4	Generation of Wastes and disposal.	<ul style="list-style-type: none"> • Wastes generated may be considered for suitably reuse in the proposed construction, subject to the suitability of the materials with the approval of the engineer. The existing bituminous surface debris may be considered for the paving of cross roads, access roads and paving works in construction camps, traffic diversion roads, haulage routes etc., • Feasibility of reuse will be decided on case to case basis by the Engineer. • DISPOSAL: Unutilized debris materials shall be suitably disposed off by the contractor in dumpsites designated by the ULB. • Avoid stockpiling any excess spoils at the site for more than a day. Excess excavated soils should be disposed off to approved designated areas 	Contractor	ULB

		<p>immediately;</p> <ul style="list-style-type: none"> • Debris generated shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. • The disposal site shall be selected preferably from barren, infertile lands; sites should be located away from residential areas, forests, water bodies and any other sensitive land uses. • All arrangements for covered transportation during construction including dismantling and clearing debris, will be planned and implemented by the Contractor in consultation with the Engineer. 		
2.5	Temporary Traffic Diversions	<ul style="list-style-type: none"> • Detailed traffic management plans will be finalized in consultation with the Traffic department and ULB and be submitted to the ULB one week prior to commencement of works. Temporary diversion will be provided with the approval of the engineer. • The traffic management plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of materials and arrangement of flagmen. • The arrangement for the temporary diversion of the land shall ensure to minimize environmental impacts, like loss of vegetation, productive lands etc., prior to the finalization of diversion and detours. • This plan will be periodically reviewed with respect to site conditions. • Special consideration will be given to the preparation of the traffic management plan for safety of pedestrians and workers at night. • Construction shall be taken phase –wise so that sections are available for traffic. • The Contractor shall also disclose to the local community about diversion in traffic routes and pedestrian access arrangements with assistance from ULB. 	Contractor	ULB
2.6	Informatory Signs/Hoardings	The contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer. The information board will also have the emergency contact details.	Contractor	ULB
2.7	Accessibility to connecting	<ul style="list-style-type: none"> • Contractor will provide safe access through temporary bridges / walkways to the adjacent residences/ buildings wherever necessary especially during 	Contractor	ULB

	roads and adjacent structures	<p>construction of drains.</p> <ul style="list-style-type: none"> Residents / Local community will be informed 3 days prior to start of construction. The Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road, providing temporary connecting road. The Contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions. The Contractor will take care that the cross roads are taken up one after one in such a sequence so that traffic movement in any given area not get affected much. 		
2.8	Transporting Construction Materials	<ul style="list-style-type: none"> All vehicles delivering fine materials like aggregate, cement, earth, sand, etc., to the site will be covered by Tarpaulin to avoid spillage of materials and wind-blown dust from the top of vehicles. Roads used by vehicles of the contractor or any of his subcontractor or suppliers of materials will be cleared of all dust/mud or other extraneous materials dropped by such vehicles. To the extent possible the contractor will transport materials to the site in non-peak hours. 	Contractor	ULB
<p>2.0 CONSTRUCTION STAGE:</p> <p>(b) EXECUTION OF WORKS:</p>				
2.9	Excavations	<ul style="list-style-type: none"> All excavations will be done in such a manner that the suitable materials available from excavation are satisfactorily utilized. The excavation shall conform to the lines, grades, side slopes and levels shown in the drawing or as directed by the engineer. While planning or execution the contractor shall take all adequate precautions against soil erosion, and take appropriate drainage measures to keep the site free of water. Proper signages on excavations; side protections to avoid slip, drip, fall shall be provided. 	Contractor	ULB

2.10	Utilities or temporary / permanent structures	<ul style="list-style-type: none"> • Identify the common utilities that would be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc. • Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts. • Where ever the entry and exit to houses/ establishments are affected due to construction activities, alternate temporary arrangement for crossing over shall be provided. • Make available the contact details of the Engineer in charge & utility providers emergency response service on site. • Make use of emergency facilities (quick response service, information service to inform about possible disruption of service due to this work & all other such facilities) of utility service provider to deal with any issues during works • Ensure that facilities/utilities and services are reinstated to original condition immediately after work in that concerned area/stretch. • Protect work areas & trenches well with permanent barricades with reflectors and proper lighting for proper visibility during night. • Make flag men service available during utility shifting. • Take all precautions to minimize disturbance to nearby communities & workers and traffic during utility shifting. Any disturbance to nearby landuses to be mitigated as soon as the work is over. Complaint resolution mechanisms to be set up on site without any concern to the communities • Accident prevention including possible fall in trenches or pits while utility shifting, entanglement on electric / other wires, hindrances or accidents which may be caused by removed pipes or materials, accidents to workers during or after shifting and other reasons - by planning the works well in advance, making arrangements for emergency response and coordinated action, arrangements with traffic police, nearby landuses, communities and other stakeholders • All wastes (including excavated materials, asbestos pipes etc) shall be stored by the contractor safely on site & shifted from site at the end of each day. These should be disposed following relevant applicable waste management rules. In the absence of facilities to dispose these as per rules, these should be well stacked following good practices for each type of waste in an approved area in the area approved in writing by the ULB engineer. • In case of chance disturbance to any religious /community assets concerned 	Contractor/ ULB	ULB / Concerned departments
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		stakeholders shall be immediately consulted in the presence of ULB engineer and appropriate remedial measures shall be taken to the satisfaction of communities/stakeholders & procedures shall be well recorded and TNUIFSL shall be informed at the earliest.		
2.11	Water Pollution from Construction Wastes	<ul style="list-style-type: none"> The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. Contractor will avoid construction works close to the streams or water bodies during monsoon. All liquid wastes generated from the site will be disposed off as directed by the engineer and in such a way that it will not pollute land, water bodies or gets pooled resulting in unhygienic conditions. All necessary precautions will be taken to construct temporary or permanent devices to prevent water pollution due to increased siltation and turbidity. Silt screens shall be provided to prevent falling materials, dust resulting in turbid conditions of nearby bodies. 	Contractor	ULB
2.12	Silting, contamination of water bodies	Construction materials containing fine particles will be stored in an enclosure such that sediments – laden water does not drain into nearby watercourses.	Contractor	ULB
2.13	Drainage requirement at construction site	In addition to the drainage requirement, the contractor will take all desired measures as directed by the engineer such measures to prevent temporary or permanent flooding of the site or any adjacent area.	Contractor	ULB

2.14	Pollution from Fuel and Lubricants/ Contamination of soil	<ul style="list-style-type: none"> • Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refueling areas. • In all, fuel storage and refueling areas, if located on agricultural land or areas supporting vegetation, the top soil will be stripped, stockpiled and returned after cessation of such storage. • Contractor will arrange for collection, storing and disposal of oily wastes as directed by the Engineer. 	Contractor	ULB
2.15	Operation of construction equipment and vehicles	<p>The Contractor will confirm the following:</p> <ul style="list-style-type: none"> • All plants and equipment used in construction shall strictly conform to the MoEFCC/CPCB noise standards. • All vehicles and equipment used in construction will be fitted with exhaust silencers. • Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. • Limits for construction equipment used in the project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. • Maintenance of vehicles, equipment and machinery shall be regular to keep noise levels at the minimum. • Idling of temporary trucks or other equipment shall not be permitted during periods of unloading or when they are not in active use. • Noisy construction activities during the night hours will be avoided near sensitive receptors like health centers and hospitals. • Ensure that all the construction equipments/ machineries are maintained properly, and have a valid PUC certificate and operated by drivers holding valid licence. 	Contractor	ULB

2.16	Dust	<ul style="list-style-type: none"> • Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction. • The fall height shall be kept low so that least amount of dust is airborne, during unloading of materials. • The contractor will take every precaution to reduce the level of dust along construction sites involving earthworks, by frequent application of water. 	Contractor	ULB
2.17	Sensitive Receptors- Impact Management	<ul style="list-style-type: none"> • The sensitive receptors includes sensitive features like Waterbodies (Rivers, Lakes, Ponds, Canals), parks/open spaces, trees, gardens, Coast, etc and other landuses like residences, schools, hospitals, religious places, community centers, grave yards, public-semipublic, transportation facilities. • Stagger work hours to suit other common uses of facilities nearby to avoid disturbances and ensure safety; stagger work hours depending on school, religious requirements of nearby land uses • Wherever necessary, time period, barrier requirements, and other pollution / impact control for construction activities may be finalized in consultation with sensitive receptors. • Periodic maintenance and calibration of construction equipment's/ vehicles to meet applicable CPCB emission standards and noise levels. • Contractor to ensure regular dust suppression measures by way of standard and efficient water sprinkling through water tankers at these designated sensitive receptors. • Adequate barricading and safety measures to protect sensitive due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction. • Provide screens (for privacy, to screen noise and dust) for work area, material storage areas and nearby land uses, & covers for materials • Working instructions / awareness to workers & contractors shall be given. • Inform all stakeholders and communities of the work and possible disturbances, safety measures & contact details of ULB engineer in charge well ahead of the work • Provide complaint register on site & report daily to EHS person of Contractor & further to ULB engineer in charge who should attend to complaints • Spill prevention and management shall be made for sand / other construction materials, fuel, etc 	Contractor	ULB

		<ul style="list-style-type: none"> • Provide cut off drains around material storage areas to prevent pollution caused by runoff • Signboards with contact details near these so that locals can report on misuse or pollution or any other complaint • Well maintained worker facilities to prevent misuse of sensitive features. • Consider seasonality of migratory species while scheduling the works • Arrange traffic regulations in co-ordination with traffic police. • Make available flag men near key landuses where there are possibilities of vehicular-vehicular-pedestrian conflicts • Avoid noise disturbance (high decibel activities) near residential areas during nighttime • Comply with applicable regulations like Air Act, Noise Rules, Water Act. • Get all regulatory permits and follow all conditions stipulated in the permit. • Access to premises to be reinstated in better condition than was existing immediately after the work is complete in the stretch/area. 		
2.18	Work-zone safety Management	<ul style="list-style-type: none"> • Temporary barricades shall be provided to delineate construction zone as well material stacking areas. The construction site and the labour facility shall be appropriately barricaded to prevent entry and accidental tress-passing of workers, staff and others into the construction sites. • All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor. • Proper retro reflective warning signage will be installed on the access road next to the construction site about movement of construction machinery and vehicles. • In excavations for longitudinal surface road drains, culverts etc., a high visibility warning and retro reflective signage shall be displayed in vermicular language and English. • Entry of unauthorized persons should beprevented. • Excavations will be adequately barricaded and well lit – with signages/info boards. • There shall be adequate lighting arrangement at night and adequate barricading to prevent mishaps after construction activity ceases for the day. • A readily available first aid unit with necessary supplies, drinking water, resting shed, sanitation etc shall be made available in every work zone. 	Contractor	ULB

2.19	Barricading site	The construction site shall be provided with firm barricading at all times in a day with adequate markings, flags, lighting, reflectors etc. for safety of general traffic movement, workers and pedestrians.	Contractor	ULB
2.20	Material Handling at site	<ul style="list-style-type: none"> All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., will be provided with protective footwear and protective goggles. Cement bags will be stored and emptied in covered area to control fugitive dust emissions. While handling and emptying cement bags, workers will wear masks, hand gloves and protective goggles. Trolley may be used for transferring of material from one place to another place. 	Contractor	ULB
2.21	Personal Safety Measures for Labour	<ul style="list-style-type: none"> Contractor will provide all necessary safety appliances like protective footwear, gum boots, hand gloves, masks, and protective goggles to all workers in the construction site especially those employed on mixing asphalt materials, cement, lime mortars, concrete etc. Welder's protective eye-shields to workers who are engaged in welding works. Workers will be allowed to rest at sufficiently safe intervals. Earplugs to workers exposed to loud noise, and workers involved in activities with high noise levels like crushing, compaction, or concrete mixing operation. Adequate safety measures for workers during handling of materials at site are to be taken up. Safety vests will be used by workers when on construction site. The contractor will comply with all regulations regarding excavations, trenches and safe means of entry and egress. The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 and other applicable labour welfare measures are adhered to. The contractor will not employ any person below the age of 14 years for any work. 	Contractor	ULB

2.22	Occupational Health and Safety Training	<ul style="list-style-type: none"> Contractors shall provide periodical health and safety training to the labourers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, training in first aid, and preventing injuring the fellow workers. 	Contractor	ULB
2.23	Emergency Management Incident Reporting	<ul style="list-style-type: none"> Emergency numbers will be displayed at the construction sites and camp site, First-Aid boxes will be made available at construction site and camp site Fire extinguishers for petroleum oil fire and electrical fire will be made available at camp site, fuel storage site, construction site etc. Train the labourers to take necessary measures during any emergencies in construction and inform the Engineer, others, etc and provide facility for the same. Designated vehicles, which can be used as ambulance will be available at construction site at all the time in case of any mishap during construction. Entry of unauthorized persons should not be prevented. The contractor will maintain an Incident Register at the work site and labour camp recording all incidents with details type of incidents (indicative/ severe/ serious), cause of the incident, action taken, etc. All incidents shall be reported to TNUIFSL in the subsequent reporting and 	Contractor	ULB

		fatalities shall be reported immediately.		
2.24	First Aid	<p>The contractor will arrange for -</p> <ul style="list-style-type: none"> • A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone. • Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital. • Availability of first aid trained persons will be ensured at the project site during construction phase. 	Contractor	ULB
2.25	Risk from Electrical Equipment	<p>The Contractor will take all required precautions to prevent danger from electrical equipment and ensure that -</p> <ul style="list-style-type: none"> • Electrical cables and wires will be properly arranged with proper electrical safety. Loose electrical connections will not be allowed at the labour camp and in work or storage areas. • Safety signs, Dos & Dont's with respect to electrical hazards will be displayed. 	Contractor	ULB
2.26	Informatory Signs and Hoardings	The Contractor will provide, erect and maintain informatory/safety signs, hoardings written in English and local language (Tamil), wherever required or as suggested by the ULB.	Contractor	ULB
2.27	Chance Found Archaeological Property	<ul style="list-style-type: none"> • Any restrictions/guidance of archaeological property in/near sites shall be followed. All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. • The contractor will take reasonable precautions to prevent his workmen or any other persons from work, and removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal 	Contractor	ULB

		<p>acquaint the Engineer of such discovery and carry out the instructions for dealing with the same,</p> <ul style="list-style-type: none"> The Engineer will seek direction from the appropriate authorities before instructing the Contractor to recommence the work in the site. 		
		3.0 POST COMPLETION WORKS		
3.1	Clearing of construction camps and restoration	On completion of the works, all temporary structures, tools, materials, construction camp area will be cleared away, all rubbish cleared, pits and trenches effectively sealed off and the site left clean and tidy & restored to pre-project conditions.	Contractor	ULB

8 Stakeholder Consultation

The proposed roads have been taken up based on the need for improvements and priority based on connectivity provided by the roads.

The ULBs have carried out consultation with the stakeholders especially the residents of the project area. During the consultation, the ULBs have explained the project proposal, and the management measures identified for implementation during the construction stage.

Public in general have accepted the proposal and requested to complete the project at the earliest.

The details of the consultation is provided in Annexure 2.

9 Implementation Arrangement

The ULBs shall include the EMP in the bid document & in the contract agreement and ensure compliance to the measures during project implementation. ULB Engineer in charge of the project shall supervise implementation of project safety and mitigation measures.

The bidders while quoting their rates for various items of works mentioned in the bill of quantities should include the cost for compliance to environmental management plan and reporting obligations on environmental aspects.

Monitoring:

Contractor to carry out sample monitoring of air and noise in key locations including dense areas, sensitive landuses. EHS person shall be employed by the contractor throughout the duration of the project to ensure implementation of EHS/ EMP measures and report monthly to the ULB. ULBs to report to TNUIFSL monthly & TNUIFSL to the Bank through Quarterly Reports with photos to enable virtual monitoring.

Annexure 1 Screening reports

Annexure 2 Minutes of Public Consultation