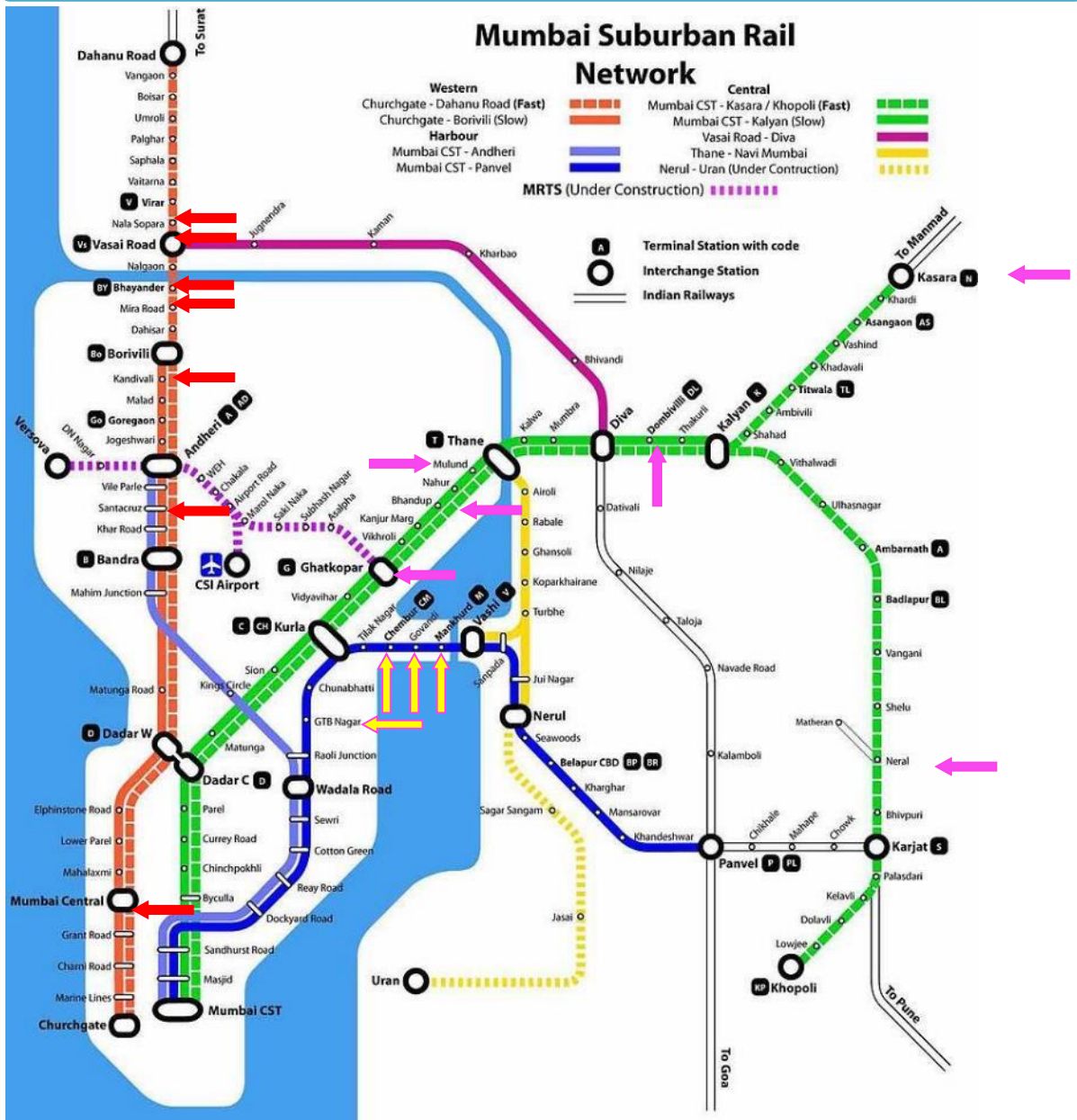


MUMBAI RAILWAY VIKAS CORPORATION LIMITED

Environmental & Social Impact Assessment, Resettlement Action Plan and Land Acquisition for Improvement of 17 Suburban Railway Stations on Mumbai Suburban Sections

Final Environment and Social Impact Assessment Report (ESIA)



August 2023

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MUMBAI RAILWAY VIKAS CORPORATION LIMITED

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NOMENCLATURE

AiIB	Asian Infrastructure Investment Bank	ESF	Environmental and Social Framework
AoI	Area of Influence	ESIA	Environmental and Social Impact Assessment
ASI	Archaeological Survey of India		
BCT	Bombay Central Terminus	ESMoP	Environmental and Social Monitoring Plan
BIS	Bureau of Indian Standards		
BMC	Brihanmumbai Municipal Corporation	ESMP	Environmental and Social Management Plan
BOCWA	Building and Other Construction Workers Act	ESZ	Ecological Sensitive Zone
C&D	Construction and Demolition	FGD	Focus Group Discussions
CBOs	Community Based Organizations	FHWA	Federal Highway Administration
CBTC	Communications-based train control	FOB	Foot Over Bridge
CGWB	Central Ground Water Board	GAP	Gender Action Plan
CIDCO	City and Industrial Development Corporation of Maharashtra	GIIP	Good International Industry Practice
CPCB	Central Pollution Control Board	Gol	Government of India
CPHEEO	Central Public Health and Environmental Engineering Organisation	GRIHA	Green Rating for Integrated Habitat Assessment
CR	Central Railways	GRM	Grievance Redressal Mechanism
CRZ	Coastal Regulation Zone	HQGRC	Head Quarter Grievance Redressal Mechanism
CST	Chhatrapati Shivaji Terminus	IFC	International Finance Corporation
CTE	Consent to Establish	IGBC	Indian Green Building Council
DG	Diesel Generator	IMD	Indian Meteorological Department
E&S	Environmental & Social	IS	Indian Standard
EHS	Environmental Health and Safety	ISO	International Organization for Standardization
EPA	Environmental Protection Act	KDMC	Kalyan Dombivli Municipal Corporation
ERDAS	Earth Resource Development Assessment System	KLD	Kilo Litre per Day
ESCR	Environmental and Social Compliance Report	LA	Land Acquisition
		LAO	Land Acquisition Officer
		LPS	Land Plan Schedule

MBMC	Mira Bhayandar Municipal Corporation	PIA	Project Implementation Agency
		PPE	Personal Protective Equipment
MCGM	Municipal Corporation of Greater Mumbai	PPM	Project-affected People's Mechanism
MLD	Million Litres per Day	PPV	Peak Particle Velocity
MMR	Mumbai Metropolitan Region	PRO	Public Relation Officer
MMRDA	Mumbai Metropolitan Regional Development Authority	PWD	Public Works Department
MoEFCC	Ministry of Environment, Forests and Climate Change	RAA	Railways (Amendment) Act
		RP	Resettlement Plan
MRVC	Mumbai Railway Vikas Corporation	RFCTLARR	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement
MSRTC	Maharashtra State Road Transport Corporation	ROW	Right of Way
MUTP	Mumbai Urban Transport Project	RPF	Resettlement Policy Framework
NAAQS	National Ambient Air Quality Standards	SDO	Sub-Divisional Officer
		SGNP	Sanjay Gandhi National Park
NABL	National Accreditation Board for Testing and Calibration Laboratories	SIMP	Social Impact Management Plan
		SPCB	State Pollution Control Board
NBC	National Building Code	SPM	Suspended Particular Matters
NBWL	National Board of Wildlife	TCFS	Thane Creek Flamingo Sanctuary
NMMC	Navi Mumbai Municipal Corporation	UIN	Unique Identification Number
		US EPA	United States Environmental Protection Agency
NOC	No Objection Certificate	WHO	World Health Organisation
NRRP	National Rehabilitation and Resettlement Policy	WR	Western Railways
PAFs	Project Affected Families		
PAPs	Project Affected Persons		

EXECUTIVE SUMMARY

Introduction

Mumbai Railway Vikas Corporation (MRVC) intends to improve 17 Railway Stations in Mumbai Suburban Railway by upgrading the level of passenger amenities. Out of the 17 stations, six are on the Central line, four are on Harbour line of Central Railway and remaining seven are on western line of Western Railway. MRVC has engaged RITES Limited to assess the Environmental and Social Impact Assessment (ESIA) of proposed development and preparation of Resettlement Plan (RP) and Land Acquisition (LA).

Project Area of Influence: Project Area of Influence (Project AoI) has been demarcated as 200 Meter from the identified railway station to assess the Environmental and Social Impact of the proposed development and extended up to 10 km to identify the NOC requirement for ecological aspects.

Objective of the Study: The study objective is preparing the Environmental & Social Impact Assessment (ESIA) including an Environmental & Social Management Plan (ESMP) as per the requirements of national and state policies & standards; and AIB's Environmental and Social Framework.

Policy, Legal and Administrative Framework

The Indian Acts, Rules and Notifications applicable to the proposed project have been considered while preparing the ESIA report. In addition to these, requirement of AIB Environmental and Social Framework is also considered. As per the MoEFCC, GoI Notifications, a rail project does not require environmental clearance.

Environment and Social Baseline

Environmental and social baseline data describes the existing environmental and social settings in the Project AoI to ascertain the baseline environmental and social conditions. The environmental and social baseline data has been compiled for Physical (Physiography, Geology & Minerals, Soil, Water, Climate, Air, Noise and Vibration), Biological (Flora and Fauna – Terrestrial and Aquatic), Cultural Resources and Socio-Economic. The data collection was carried out in the months from October 2020 to December 2021.

Project Description

The proposed 17 stations for improvement namely Bhandup, Mulund, Ghatkopar, Dombivli, Neral, Kasara, GTB Nagar, Chembur, Govandi, Mankhurd, Mumbai Central (Local), Santacruz, Kandivali, Mira Road, Bhayandar, Vasai Road and Nalla Sopara. The improvement proposed are FoB's, elevated decks, improving entry/exit, improve circulating area, etc.

Physical Environment

Physiography: The physiographic features of proposed Project Aol are flat terrain.

Geology and Minerals: The basalt is a predominant rock formation under Deccan TRPs in the proposed Project Aol. No minerals are available in and around the Project Aol.

Soils: In the Project Aol, Soil samples from 17 various locations were collected and analyzed to establish the baseline characteristics and it was found that soil is deficient in Nitrogen and Phosphorous.

Land Use Pattern: The land use of the Project Aol is predominately settlement.

Seismicity: The proposed Project Aol falls in Moderate Damage Risk Zone (Zone III) as per revised seismic zoning map of India.

Water: In order to assess the baseline water quality status of the Project Aol, 17 samples were collected in the Project Aol and it was found all the sample are within permissible limits as per CPHEEO manual for Drinking Water Specifications.

Air: In order to assess the air quality status of the Project Aol, 17 samples were collected in the Project Aol and it were found the all parameters was within the permissible limits as specified National Ambient Air Quality Standards for residential, rural & other areas. However, PM₁₀ and PM_{2.5} was exceeding the permissible limits at all locations as per IFC standards.

Noise: Noise level monitoring was conducted at 17 locations in the Project Aol and it was found that Leq for day and night at all monitoring locations were exceeding the permissible limits for commercial zone as per National Ambient Noise Standards.

Vibration: Vibration monitoring was carried out at 17 locations. Vibration levels varies from 0.254 to 3.479 mm/s.

Biological Environment

An ecological study was conducted in Project Aol in the month October 2020-December 2021. Primary data was collected through field survey of 17 identified stations proposed for the development.

Flora: During survey it was identified that total 254 trees are likely to be impacted due to proposed development activity at 17 stations. In Neral and Mulund stations maximum number of trees is likely to be impacted. There are three stations where no trees impacted. 12 stations will have the impacted tree count under 25 trees As per studies no rare, endangered, endemic & threatened species are found in the project Aol.

Fauna: The pond heron has been observed at surface water pond in the Project Aol of the Mankhurd station and kingfisher, common pigeon & pair of common pigs were observed in the Project Aol of Kasara station. As per studies no rare, endangered, endemic & threatened species are found in the Project Aol

Ecologically Sensitive (Natural Reserve) Sites in extended identified influence area: Two ecologically sensitive sites were found within the extended influence area of 10 km of 17 identified proposed Stations i.e. Thane Creek Flamingo Sanctuary (TCFS) and Sanjay Gandhi National Park (SGNP).

Ecological Sensitive Zone of Sanjay Gandhi National Park (SGNP) has been notified by MoEFCC. Out of 17 identified proposed stations no stations fall under ESZ of SGNP. The MoEFCC issued draft notification dated 8th April 2021 has an area of 16.90 square kilometers.) The Ecological Sensitive Zone shall be to an extent of 0 (zero) to 3.89 kilometres around the boundary of Thane Creek Flamingo Sanctuary and the area of the Eco-sensitive Zone is 48.32 square kilometres.

7 identified stations namely Mankhurd station, Bhandup station, Govandi station, Mulund station, Chembur station, GTB Nagar station and Ghatkopar station are located within 10km from the boundary of TCFS. However, the project does not require environmental clearance, Therefore, NOC from National Board of Wildlife (NBWL) is not required for this project.

Cultural Resources

Cultural resources identified within Project Aol are 37 numbers.

Socio-Economic Profile

The socio-economic survey findings shows that nine project affected families (PAFs) which include 13 residential project affected persons (PAPs) are likely to be affected at Mumbai Central station and five commercial PAPs are likely to be affected at Chembur station. Total 18 PAPs are likely to be affected by this proposed development. The findings of census survey revealed that all the surveyed families belonged to Hindu and Jain religions and were from the general category of the population. The educational attainment of PAPs reveals that 50% PAPs (22.22% male and 27.78% female) are literate up to upper primary followed by high school which is 27.78% (16.67% male and 11.11% female), 11.11% PAPs (5.56% male and 5.56% female) are graduate and 11.11% PAPs (11.11% female) are up to primary level. No illiterate persons reported in survey findings. The survey results show that 44.44% of PAPs belong to the working-class population who are above 18 years of age and less than 60 years of age. Out of the total working-class population, 62.50% of PAPs are working. 40% of PAPs are engaged in business activities, and 60% are engaged in private sector jobs. The average family income is Rs.30,000/- per month.

Environmental and Social (E&S) Profile of Project Aol.

Sensitive receptors like Hospitals and Educational Institutes within project Aol are 61.

Environment and Social Risk and Impact Analysis

The impacts on various aspects of the social and physical environment likely to result during various phases of project cycle.

Impacts due to Project Location and Design

Loss of Forest: Approximately 254 trees are likely to be impacted. Out of 254 trees 153 trees needs to be cut and 101 needs to be transplanted. All species are exotic, and no fruit bearing trees are observed during field survey and no rare or endangered species of trees have been noticed during field studies.

Encroachment into Forest Lands and Loss of Forest Produce: As Area of Influence (Aol) of 17 identified stations proposed in this project do not fall in Forest Land, no encroachment into forest land and loss of forest produce are anticipated.

Encroachment into Natural Reserves: The Aol of 17 identified stations proposed in this project do not fall under notified ecological sensitive areas like national park, biosphere reserve, wildlife sanctuary, nature reserve, community reserve. Hence, no impacts on natural reserves are anticipated.

Effect on Water Resources inside and outside the Project: The surface water resource is not available within the Aol of 17 identified stations proposed in this project except Mankhurd Station. However, the major improvement at Mankhurd station is proposed on western side and the water body is located on eastern side. Hence no impact on water resources is anticipated.

Climate Risk: The impact of earthquake cannot be predicted; only precautionary measures would reduce the impact. Engineering construction will be done to meet Codal provisions of Bureau of Indian Standards (IS: 1893-Part-1:2002) so that they can withstand the seismic forces. No other climate risk is anticipated due to this project.

Impacts on Historical and Cultural Monuments: No Historical and Cultural Monuments are falling under the Aol of 17 identified stations. Hence, no impact on Historical and Cultural Monuments is anticipated. As such, NOC under The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 are not required.

Social Impacts: 15.85 ha of land will be required for e station improvement project. Out of the total land requirement, majority of land (98.99%) belongs to railway authority whereas 1.01% of land is other government department. Efforts were made by the MRVC to utilize existing railway land to avoid private land acquisition and involuntary resettlement for the

proposed development. Total nine structures are likely to be affected which include four residential and five commercial structures. All nine structures are illegal and developed on government land. Total 18 PAPs are likely to be affected from this proposed development.

Green Building Features: The development of 17 identified stations including planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms and GRIHA (version 2015) norms.

Impacts due to Project Construction

Soil Pollution at Construction Sites: The Impact on soil owing to the construction includes soil erosion, compaction, and pollution of soil in case of waste discharge on land. The impact on soil will be short term & insignificant and limited to construction activities area. However, proactive mitigation measures have been proposed.

Water Pollution at Construction Sites: The surface water resource is not available within the AoI of 17 identified stations proposed in this project except Mankhurd Station, however the major improvement proposed at Mankhurd stations is on western side and the water body is located on eastern side. Hence, no impact on water resources is anticipated. However, proactive mitigation measures have been proposed.

Air Pollution: Particulate pollution occurs due to excavation, loading/unloading of construction materials, vehicular, construction equipment and DG sets, etc. Due to the confined nature of construction activity during limited period, tailpipe emissions from construction equipment are assumed to be negligible. However, proactive mitigation measures have been proposed.

Noise Pollution: The major sources of noise pollution during construction are movement of vehicles for transportation of material and equipment. Noise emissions levels from construction equipment (L_{max}) measured at 50 feet distance ranged from 74 dB (A) to 96 dB (A), which decreases with increase in distance. As all the 17 identified stations baseline noise exceeds the standards, hence mitigation measures are proposed to reduce the construction noise pollution.

Vibration Impact: The construction activities will be carried out for foundation, FoB, Deck, etc. Trucks/vehicle movement, Rock drilling will be used for foundation. Use of construction machinery and equipment will be of short term and hence insignificant impact on structures is anticipated.

Impact due to Muck Disposal: The source of muck generation is excavation for foundation. The muck generated will be reutilized at the same station. Hence, impact due to disposal of muck is anticipated to be negligible.

Impact due to Hazardous Waste: Hazardous waste would mainly arise from the maintenance of equipment. Unsafe disposal can result in water and soil pollution. Hence, proactive mitigation measures have been proposed.

Impact on Water Supply, Sewage Disposal and Solid Waste Management due to Labour Camp: Stations identified for development lie on three different lines of Mumbai Suburban railway network and labour requirement at each station would be about 30 persons during peak construction activity and labour is expected to be locally available in the project area. As such, labour camps are not anticipated in this project.

Soil Erosion: The location of proposed development is plain area, and no natural drainage is available at the construction site of 17 identified stations. However, during rainy seasons, runoff from unprotected excavated areas, etc., would result in increased soil erosion. Proactive mitigation measures are proposed.

Land Subsidence: The proposed project of improvement of 17 identified stations does not involve the deep excavations; hence, occurrence of land subsidence is not anticipated.

Water Consumption: Water demand during construction for labours is estimated about 1.35 KLD at each station. The water requirement will be met through the existing water supply system at the stations.

Impact due to Supply of Construction Material: Construction material such as aggregate and earth are sourced from approved quarries so that environmental impacts as well as wastage of natural resources are minimized.

Impact due to Construction/Demolition Waste: Construction and Demolition (C&D) waste is part of solid waste that results from land clearing, excavation, construction, demolition, etc. The Construction/Demolition waste generated in this project will be disposed as per the Construction and Demolition Management Rules, 2016.

Occupational Health and Safety: The impact on occupational health and safety during the construction phase is anticipated to be of insignificance, as the construction of FOB and other activities will be done through experienced and trained workers. Proactive mitigation measures have been proposed.

Labour Welfare: Facilities such as shelter at workplace, canteen, first aid and day crèche are statutory requirement and essential to productivity. All the facilities as per Building and Other Construction Workers Act, 1996 (BOCWA) will be provided.

Impacts due to Project Operation

Noise and Vibration Impact: There is no impact of noise and vibration during operation is anticipated as no noise and vibration producing equipment or machineries will be used during operation.

Energy Demand: Requirement of electrical energy for climate control, lighting, passenger information, escalators, lift and other facilities at stations shall be optimized by proper use of natural day/night light and design of passenger flow inside stations and on streets outside stations.

Employment Opportunities: During construction local skilled and unskilled labourers will have an opportunity for employment directly or indirectly. Approximately 510 persons are likely to work during project construction. Thus, the project would provide substantial direct employment; besides, more people would be indirectly employed in allied activities and trades.

Improved Infrastructure: The improvement proposed in this project at 17 identified stations will substantially increase station's quality of service, in terms of comfort, facilities and pedestrian mobility.

Occupational Health and Safety: The impact on occupational health and safety during the operation phase is not anticipated, as activities will be done during operation phase.

Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) contains details of proposed remedial measures and monitoring plan for the location & design, construction and operational phase of the project.

ESMP due to Project Location and Design

Compensatory Afforestation: Approximately 254 trees have been impacted with the proposed development at identified 17 proposed railway stations. Out of 254 trees 153 trees are proposed to be cut and 101 proposed to be transplanted. Total number of trees proposed for compensatory plantation is 459 (3 times the number of trees to be cut) with five years maintenance. Location of land for plantation and transplantation will be decided by MRVC, in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) as well as Forest Department. The estimated cost for compensatory plantation and transplantation for impacted trees is about Rs. 54,43,544 (Rs 5.44 million).

Social Management Plan: To address the adverse social impacts, Social Management Plan has been proposed for successful implementation of the project. Social Management Plan covers issues like compensation for loss of land, loss of livelihood, community property, community health and safety, encroacher and squatter issues, labour welfare and management, community consultation during design, construction and operation of the project.

Green Buildings: The proposed development of 17 identified stations including planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms.

ESMP during Construction

Soil and Water Pollution Management at Construction Sites: As such, the impact on soil quality and water quality is short term in nature, which can be avoided by applying good construction practices. To control the soil and water pollution during construction stage, mitigation measures proposed in this report should be implemented and cost will be part of civil contract.

Air Pollution Management: Mitigation measures proposed in this report should be implemented to reduce the air pollution and their cost will be part of civil contract.

Noise Pollution Management: Careful planning of machinery operation and scheduling of operations can reduce the noise levels. Mitigation measures proposed in this report should be implemented to reduce the air pollution and their cost will be part of civil contract.

Muck Disposal Management: The excavated material shall be graded to determine if it can be re-used in construction. Any unusable excavated material will be disposed at the identified disposal site. Disposal sites will be identified by MRVC in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) such that environment of water bodies and green areas will not be impacted.

Hazardous Waste Management: The Hazardous waste management should be handled by authorised/licensed agent as per guidelines of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 & its amendments. The contractor shall approach only Authorized Recyclers for treatment and disposal of Hazardous Waste, under intimation to the Project Authority.

Soil Erosion and Land Subsidence Management: Temporary erosion/sedimentation and pollution control measures will be used to control the phenomenon of erosion, sedimentation and pollution that may develop during normal construction practices. To manage land subsidence, measures including maintaining adequate distance of the trench from existing structures adjacent to the trench, measures to support the walls of the trench as well strengthen soil underneath adjacent structures will be required.

Construction Material Management: The scheduling of material procurement and transport shall be linked with construction schedule of the project. During the construction period, the construction material storage site is to be regularly inspected for the presence of uncontrolled construction waste. The Contractor shall be responsible for management of such construction material during entire construction period of the project.

Construction/Demolition Waste Management: The contractor is required to take the measures in accordance with Construction and Demolition Waste Management Rules 2016.

Occupational Health and Safety: The construction works shall be carried out in accordance with all applicable legislation and Indian statutory requirements and guidelines-OHSAS 18001-2007: Occupational Health and Safety Management System and ISO 14001-2015: Environmental Management Systems. The EHS manual should be prepared in line with National regulations.

Labour Welfare: All the facilities should be provided as per Building and Other Construction Workers Act, 1996 (BOCWA).

ESMP during Operation

No negative impacts are anticipated during operation; hence no mitigation management and management plan is proposed.

Environment and Social Monitoring Plan

Construction Phase: Environmental monitoring will be carried out for air, noise, water and soil during construction phases of the project. The contractor will be responsible for carrying out monitoring during construction under the supervision of Project Implementation Agency (PIA). The environmental monitoring cost during construction phase is estimated as Rs. 79,56,000.00 (Rs. 7.95 million).

Operation Phase: No negative impacts are anticipated during operation; hence no mitigation management, management plan and monitoring is proposed.

ESMP Reporting Arrangement and Institutional Strengthening

The supervision and reporting process with respect to implementation status of mitigation measures during construction will initiate from the contractor at the lowest rung who will report to the Project Implementation Agency (PIA). Environmental and Social Cell in MRVC which will play crucial role in implementation of ESMP and Environmental and Social Monitoring Plan (ESMoP) and submit the Environmental and Social Compliance Report (ESCR) to AIIB.

Environment and Social Management System (ESMS)

Roles and responsibilities for preparation and implementation of Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) has been prepared. Most of the mitigation measures for the construction phase impacts will form the part of tender documents. The responsibility for their compliance would be binding on the prospective contractor as per the contract conditions. The overall responsibility for implementation and monitoring of mitigation measures, however, will rest with the Project

Implementation Agency (PIA) i.e. MRVC whereas MMRDA will be responsible for supervision of resettlement activities.

Analysis of Alternatives

As the proposed works are related to improvements of the existing 17 stations, hence Alternative Analysis study is not anticipated. However, during the DPR preparation the station improvement elements were finalized based on various design considerations to reduce the impact on environmental and social aspects.

Public Consultations and Information Disclosure

In order to engage with the community, enhance public understanding of the project, and address the issues pertaining to environment and resettlement, various sections of the likely affected persons, such as traders, shop owners, residents, squatters, kiosks, daily passengers, student and working groups, were involved during the ESIA Study. The station masters, various government departments, CBOs (Community Based Organizations), auto and taxi drivers were consulted at 12 station locations across the Central, Western and Harbour lines of Mumbai Suburban Railway. Focused Group Discussions (FGDs) were carried out with passengers, auto and taxi drivers, women etc. The feedback and suggestions of those likely affected and those interested in the project were recorded through various consultations. A summary of the ESIA and RP translated in Marathi will be disclosed to the stakeholders, and their views and suggestions will be considered depending on their applicability.

Grievance Redressal Mechanism

The existing Grievance Redress Mechanism (GRM) of MRVC for MUTP 3 Project will be used to receive, evaluate and facilitate the resolution of affected persons and other stakeholder's concerns, complaints, and grievances about the environmental and social performance at the project level.

The Grievance Redress Mechanism includes Grievance Redress Committee (GRC) at headquarter level and field level one at each line i.e Central, Harbour & Western Line for redressing grievance of people in issues related to land acquisition, R&R and other issues. The affected person will also have the option of taking recourse to court of law if the person is not satisfied with the GRC decisions.

Conclusion and Recommendations

15.85 ha of land will be required for station improvement project. Out of the total land requirement, majority of land (98.99%) belongs to railway authority whereas 1.01% of land is other government department. Efforts were made by the MRVC to utilize existing railway land to avoid private land acquisition and involuntary resettlement for the proposed

development. Total nine structures are likely to be affected which include four residential and five commercial structures. All nine structures are illegal and developed on government land.

The Environmental and Social Management Plan (ESMP) describes mitigation measures for impacts specific to project activities and also discuss implementation mechanism. The implementation of ESMP will help in complying national/state regulatory requirements. The estimated cost of Management Plan, Monitoring Plan and Rehabilitation and Resettlement Budget excluding cost of direct purchase of land is Rs.3,08,40,926.00 (Rs.30.84 million).

The incorporation of environmental and social management plans will have positive impact in enhancing the environmental sustainability of the project. Thus, it can be concluded that the project is environmentally & socially sustainable and substantially increase station's quality of service, in terms of comfort, facilities and pedestrian mobility.

EXECUTIVE SUMMARY OF RESETTLEMENT PLAN

• Project Description

Mumbai Railway Vikas Corporation (MRVC) intends to improve 17 Railway Stations in Mumbai Suburban Railway by upgrading the level of passenger amenities by way of new constructions/renovations including improvement of the station buildings, platform surfaces, circulating area to better standards so as to serve the need of the passenger. Out of the 17 stations, six are on the Central line, four are on Harbour line of Central Railway and remaining seven are on western line of Western Railway. The Asian Infrastructure Investment Bank (AIIB) is considering providing loan assistance for improvement of 17 Railway Stations in Mumbai Suburban Railway under the Mumbai Urban Transport Project (MUTP) IIIA Project. The project involves station improvement covering the aspects of station sizing, platform, concourse, staircase widths, deck, escalators, signage, entry/exit points, foot over bridge (FOB), passenger amenities, ticketing, waiting area, etc.

Earlier, in accordance to the requirement of a 'Category A' project, a Social Impact Assessment (SIA) report including a Resettlement Plan (RP) was prepared. The RP was prepared to provide mitigation measures of the impact identified in the Social Impact Assessment (SIA) report. The RP complies with the guidelines outlined in Resettlement Policy Framework (RPF) adopted for the project. The project was assigned as 'Category A', but after the decreased number of affected structures and families the project category is been assigned as 'Category B'. Environmental and Social Standard (ESS) 1: Environmental and Social Assessment and Management; and ESS 2: Involuntary Resettlement of AIIB's ESF will be triggered.

• Scope of Land Acquisition and Resettlement

15.85 ha of land will be required for station improvement project. Out of the total land requirement, majority of land (98.99%) belongs to railway authority whereas 1.01% of land is other government department. Efforts were made by the MRVC to utilize existing railway land to avoid private land acquisition and involuntary resettlement for the proposed development. Total 9 structures are likely to be affected which include four residential and five commercial structures. All 9 structures are illegal and developed on government land. Total 18 PAPs are likely to be affected from this proposed development.

• Socio-economic Information and Profile

The findings of census survey revealed that all the surveyed families belonged to Hindu and Jain religions and were from the general category of the population. The educational attainment of PAPs reveals that 50% PAPs (22.22% male and 27.78% female) are literate up to upper primary followed by high school which is 27.78% (16.67% male and 11.11% female), 11.11% PAPs (5.56% male and 5.56% female) are graduate and 11.11% PAPs (11.11% female) are up to primary level. No illiterate persons reported in survey findings.

The survey results show that 44.44% of PAPs belong to the working-class population who are above 18 years of age and less than 60 years of age. Out of the total working-class population, 62.50% of PAPs are working. 40% of PAPs are engaged in business activities, and 60% are engaged in private sector jobs. The average family income is Rs.30,000/- per month.

- **Consultation, Participation and Information Disclosure**

In order to engage with the community, enhance public understanding of the project, and address the issues pertaining to resettlement, various sections of PAFs (traders, shop owners, kiosks,) and other stakeholders (daily passengers, students, working groups, station masters, community-based organization (CBOs), auto and taxi drivers were consulted at 12 station locations during the ESIA Study while carrying out census and socio-economic surveys. FGDs were carried out with women, passengers, auto and taxi drivers, etc.

The feedback and suggestions of those likely affected and those interest in the project were recorded through various consultations. A summary of the RP translated in Marathi will be disclosed to the stakeholders, and their views and suggestions will be considered depending on their applicability.

- **Grievance Redress Mechanism**

The existing Grievance Redress Mechanism (GRM) of MRVC for MUTP 3 Project will be used to receive, evaluate and facilitate the resolution of affected persons and other stakeholder's concerns, complaints, and grievances about the environmental and social performance at the project level.

The Grievance Redress Mechanism includes Grievance Redress Committee (GRC) at headquarter level and field level one at each line i.e Central, Harbour & Western Line for redressing grievance of people in issues related to land acquisition, R&R and other issues. The affected person will also have the option of taking recourse to Court of Law at any time during in the course of the project.

- **Policy and Legal Framework**

The Resettlement Policy Framework (RPF) for the MUTP-III has been finalized based on the provisions of National and State laws, State Government decisions, and guidelines of Environmental and Social Framework (ESF) and Project Affected Peoples' Mechanism of the Asian Infrastructure Investment Bank (AIIB) and the same have been approved by the AIIB. Therefore, the present RP for the proposed project has been prepared in accordance with RPF of MUTP-III Project.

- **Entitlements, Assistance and Benefits**

The affected persons meeting the cut-off date requirements will be entitled to a combination of compensation measures and resettlement assistance, depending on the nature of ownership rights of lost assets and scope of the impact, including social and economic vulnerability of the affected persons. An Entitlement Matrix (EM) has been formulated with all possible types of losses and the corresponding nature and eligibility for entitlements of the project affected families.

The date of publication of the preliminary notification for Direct Purchase of private land will be treated as the cut-off date for titleholders. For non- titleholders the cut-off date will be 1st January, 2018 as per Govt. Decision No. SANKIRNA-03/2015 dated 12/05/2015. Based on conceptual plan received from MRVC dated 4th October, the census and socio-economic survey was started from 7th November, 2020. In order to minimize resettlement and rehabilitation, MRVC revised GADs accordingly. Subsequently, census and socio-economic survey was re-conducted from 10th Sept 2021 to 15th Oct 2021 in Aol. After several rounds of scrutiny of GADs and joint site inspection by MRVC, it was further notified that there will be minimum resettlement and rehabilitation due to proposed project. The cut-off date will be the completion date of census and socio-economic survey.

This project will not involve any private land acquisition. In future if any private land gets acquired, land acquisition by Direct Purchase through negotiations with the land owners as per Govt. of Maharashtra's Decision No. SANKIRNA-03/2015 dated 12/05/2015 will be applicable. In case the Direct Purchase fails, the land will be acquired under Railway (Amendment) Act 2008 and the compensation will be calculated as per the Schedule I and Schedule II of the RFCTLARRA 2013. The compensation in direct purchase method will have 25% additional amount on the compensation calculated as per Section 26 to 30 of RFCTLARR Act 2013.

- **Relocation of Housing and Resettlement**

The MRVC will provide compensation at replacement cost for affected structures in accordance with the eligibility and entitlements elucidated in Chapter-2 of this report. Further, compensation for partially damaged structures and shifting assistance has also been provided for affected families in the entitlement matrix. Compensation to the non-titleholders for the loss of assets other than land, such as dwelling units and shops has been provided in the entitlement matrix. The entitlements to the non-titleholders will be provided only if they were in occupation of the land or structure in the project area prior to the cut-off date (the date of completion of census survey). The census & socio-economic survey was once again carried out after new modification in the design from the 10th Sept. 2021 to the 15th Oct. 2021.

- **Income Restoration and Rehabilitation**

The project will cause loss of commercial units. Further, the entitlement proposed for this project has adequate financial provisions for restoration of livelihood of affected persons. Suitable income restoration schemes will be identified and implemented by MRVC with the assistance of social cell. Efforts will be made to provide employment opportunities to the affected persons during the construction phase by facilitating their engagement by the civil works contractor.

- **Resettlement Budget and Planning**

The resettlement and rehabilitation budget for the project has been estimated **Rs. 1,74,41,380.00 (Rs. 17.44 million)** excluding estimated cost of direct purchase of land. In future if private land gets acquired, the compensation for land acquisition will be determined in lieu of Direct Purchase Method or Acquisition of land on payment of compensation as per RFCTLARR (Maharashtra) Act 2013 and RFCTLARR Act 2013. MRVC will make adequate budget for all land acquisition compensation (if required) and R&R assistance from the counterpart funding. The budget estimates and its sources will be reflected in RP.

- **Institutional Arrangement**

Mumbai Railway Vikas Corporation (MRVC) will be the implementing agency, responsible for execution of the project. MRVC will be supported in implementation activities by Mumbai Metropolitan Regional Development Authority (MMRDA).

- **Implementation Schedule**

The implementation schedule for RP will be linked to the overall project implementation program. Upon the approval of RP, the payment of compensation and allowances under R&R benefits will be disbursed as per the approved RP.

The R&R activities of the proposed project are divided into three broad categories based on the stages of work and process of implementation. In the project preparation stage, identification of required land for acquisition, census & socio-economic survey, public consultation, preparation and review/approval of final RP, disclosure of RP, and preparation of resettlement site shall be carried out. Activities like notification of land acquisition, joint measurement, valuation of structure, payment by competent authority, shifting of PAPs shall be taken up during RP implementation. During monitoring and evaluation stage internal monitoring will be carried out by MRVC.

- **Monitoring and Reporting**

Implementation of Resettlement Plan will be monitored internally and evaluated externally. MRVC will be responsible for internal monitoring. The social cell of MRVC is responsible for supervision and implementation along with preparation of monthly progress reports on

resettlement activities. The social cell will submit monthly progress report to ED-Civil on first week of each following month and half yearly progress report prepared by MRVC will be submitted to AIB.

CHAPTER 1. INTRODUCTION

1.1 Background

Mumbai (also known as Bombay) is the most populous city of India and is also financial, commercial and entertainment capital of India. The numerous employment opportunities in different sectors attract majority population from different parts of the country there by, making it the most populous city of India.

A dominant feature of mass transportation in Mumbai is the overwhelming dependency on suburban railway system. The Mumbai Suburban Railway system is operated by Indian Railways two zonal divisions Western Railways (WR) and Central Railways (CR). The fast commuter rail corridors on Central Railway as well as Western Railway are shared with long distance and freight trains, while inner suburban services operate on exclusive parallel tracks. Western Railways operates the Western Line and Central Railways operates the Central Line, Harbour Line, Trans-Harbour Line as well as the Vasai Road-Diva-Panvel line.

Mumbai's suburban railway network is the busiest commuter train system with 8.2 million people using the trains to commute daily. Annually, the suburban railways transport 2.95 billion passengers, which is about a third of the world's population. Due to extensive reach of Mumbai Suburban Railway across the Mumbai Metropolitan Region, and its intensive use by the local suburban population, the Mumbai Suburban Railway suffers from excessive overcrowding. Over 7,000 passengers are packed in a 12-car rake during peak hours as against the rated carrying capacity of 3,600.

The capacity enhancement work under MUTP I & II have resulted in increase in Railway corridors and conversion of all nine car rakes into 12 car rakes. Further, augmentation of services and increase of length of trains to 15 coaches is underway. These additional services have increased commuter volume at the station and therefore station capacities are required to be upgraded. MUTP III is in progress and will lead to similar capacity enhancements. There is urgent need for additional circulating space by provision of elevated decks, interconnection between Foot Over Bridges (FOBs) and improving entry/exit points.

Mumbai Railway Vikas Corporation (MRVC) intends to improve 17 Railway Stations in Mumbai Suburban by upgrading the level of passenger amenities by way of new constructions/renovations including improvement of the station buildings, platform surfaces, circulating area to better standards to serve the need of the passenger. MRVC has engaged RITES Limited to assess the Environmental and Social Impact Assessment (ESIA) of proposed development and preparation of Resettlement Plan (RP) and Land Acquisition Plan (LAP).

1.2 The Project

The proposed project is on improvement of 17 Suburban Railway Stations of Central and Western Railway in Mumbai.

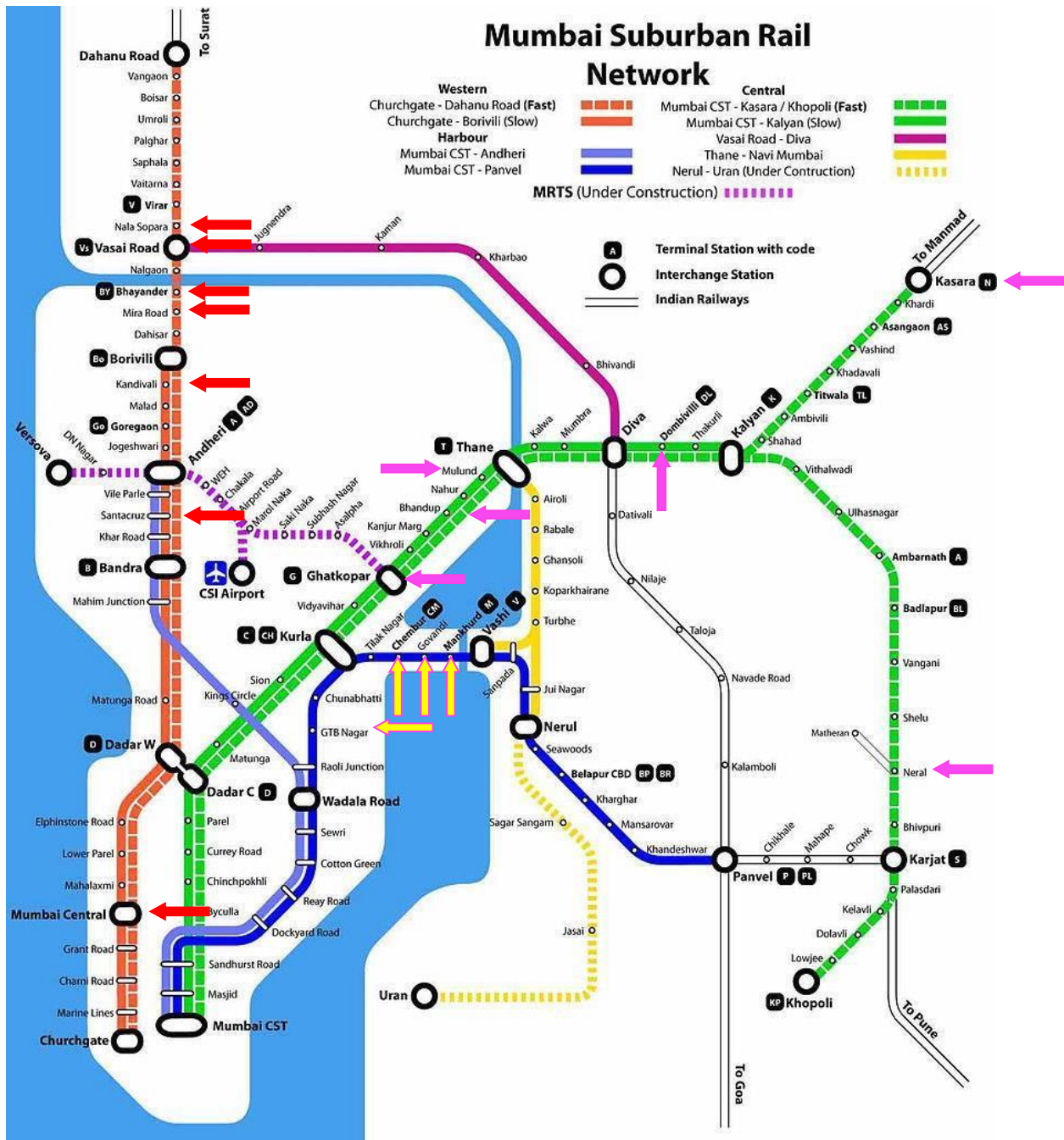
1.2.1 STATION IMPROVEMENT AND LAND ACQUISITION PLAN

Due to the capacity enhancement work, conversion of all nine car rakes into 12 car rakes under MUTP I & II and increase of length of trains to 15 coaches which is underway, the commuter volume at the stations is increased. MUTP III is also in progress and will lead to similar capacity enhancements. Therefore, station capacities are required to be upgraded by the provision of elevated decks, interconnection between Foot Over Bridges (FOBs) and improving entry/exit points, etc. Station Improvement is proposed on 17 stations. Out of the 17 stations, six are on the Central line, four are on Harbour line of Central Railway and remaining seven are on western line of Western Railway. The list of proposed 17 stations for improvement is shown in **Table 1-1** and **Figure 1.1**. During initial stage, out of 17 stations, land acquisition is required at four stations namely Mumbai Central local, Kandivali, Mira Road and Nalla Sopara. Later, MRVC made changes in the design to avoid private land acquisition and involuntary resettlement. The existing railway and government land will be utilised for station improvement project.

Table 1-1: Proposed 17 Stations for Improvement

S. No.	Railway Network	Line	Station
1.	Central Railway	Central Line	Bhandup
2.			Mulund
3.			Ghatkopar
4.			Dombivli
5.			Neral
6.			Kasara
7.		Harbour Line	GTB Nagar
8.			Chembur
9.			Govandi
10.			Mankhurd
11.	Western Railway	Western Line	Mumbai Central (Local)
12.			Santacruz
13.			Kandivali
14.			Mira Road
15.			Bhayandar
16.			Vasai Road
17.			Nalla Sopara

Figure 1.1 Proposed 17 Stations on Mumbai Suburban Railway Sections



- Western Railway Stations ←
- Central Railway Stations ←
- Harbour Railway Stations ←

1.3 Project Area of Influence

To undertake this assignment, Project Area of Influence (Project Aoi) has been demarcated. Project Aoi is the area of 200 meter from the identified railway station to assess the environmental and social impact of the proposed development. To identify the NOC requirement for Ecological aspects the Aoi has been extended upto 10 km from the identified stations.

1.4 Objective of the Study

The study envisages assessing the direct and indirect impact on the Environment in the Area of Influence (Aoi) due to station development of existing identified 17 suburban railway stations & ancillary facilities for the project.

- The study objective includes the impact assessment of proposed developments on environmental and social settings in Project Area of Influence (Aoi).
- To prepare socio-economic profile of the 100% project affected families/persons based on information collected during census & socio-economic survey.
- To minimize and/or avoid the adverse impacts, necessary modifications to be made at design stage. But in cases of unavoidable negative impacts these would be mitigated through suggested appropriate measures.
- To prepare the Environmental & Social Impact Assessment (ESIA) including an Environmental & Social Management Plan (ESMP) as per the requirements of National and State policies & standards; and AIIB's Environmental and Social Framework.
- To integrate ESMP into the relevant project contracts for implementation.
- To prepare Resettlement Plan (RP) as a part of SIA study to mitigate negative impacts of the proposed project by taking the Resettlement Policy Framework (RPF) prepared for MUTP III as benchmark.
- To prepare the Land Acquisition proposals in connection with these projects and assist MRVC to process the same.
- To assist MRVC for Preparation of documentation for various approval and permission related to Environment.
- To conduct an E&S Due Diligence and/or Audit of the facilities.

1.5 Scope of ESIA, RP and LA Study

Scope of work ESIA, RP and LA is as per the Terms of Reference of contract agreement no. CA No. MRVC/W/ ESIA of station Dev. and CBTC/ consultancy/2020 signed by RITES and MRVC on Date. October 01, 2020.

1.6 Approach and Methodology

1.6.1 APPROACH

The Environmental & Social Impact Assessment (ESIA) and Resettlement Plan (RP) study approach will focus on delivering the services required to meet the study objectives within the agreed scope and timeframe while maintaining professional quality meeting Client's expectations. The approach will be collaborative and coherent to complete the project within the time limit. Regular communications will be maintained with all project stakeholders including key stakeholders and other affected community groups. We will also draw from our extensive experience in providing consultancy services for similar projects in different parts of Maharashtra and India, and the general approach will be based on:

- A clear understanding of the project's wider objectives and the Scope of Work.
- Acts, policies, guidelines, government resolution and order issued by Govt. of India and Govt. of Maharashtra.
- A clear understanding and appreciation of the local conditions based on site visits and previous experience in similar projects.
- Rapid mobilization of suitable team of experts with proven success on other similar projects.
- Formulation of an appropriate work plan based on understanding of the important issues and likely time requirements.
- Use of effective project management and coordination systems.
- Development of a close relationship with client officials to ensure that matters are discussed openly and resolved quickly.
- Establishing strong links and encouraging frequent and open communications with all concerned stakeholders, especially in relation to the finalization of the proposals.
- Preparing all reports as per the requirements of MRVC and AIIB.

1.6.2 STUDY METHODOLOGY

The methodology adopted for conducting Environmental & Social Impact Assessment (ESIA) and RP involves desk research, field visits and reconnaissance survey, environmental monitoring, census and socio-economic survey, impact analysis, alternative analysis, land acquisition survey, public consultation and stakeholder analysis, Focus Group Discussion (FGD). The flow chart showing the methodology adopted for ESIA study is shown in the **Figure 1.2**.

A. Desk Research

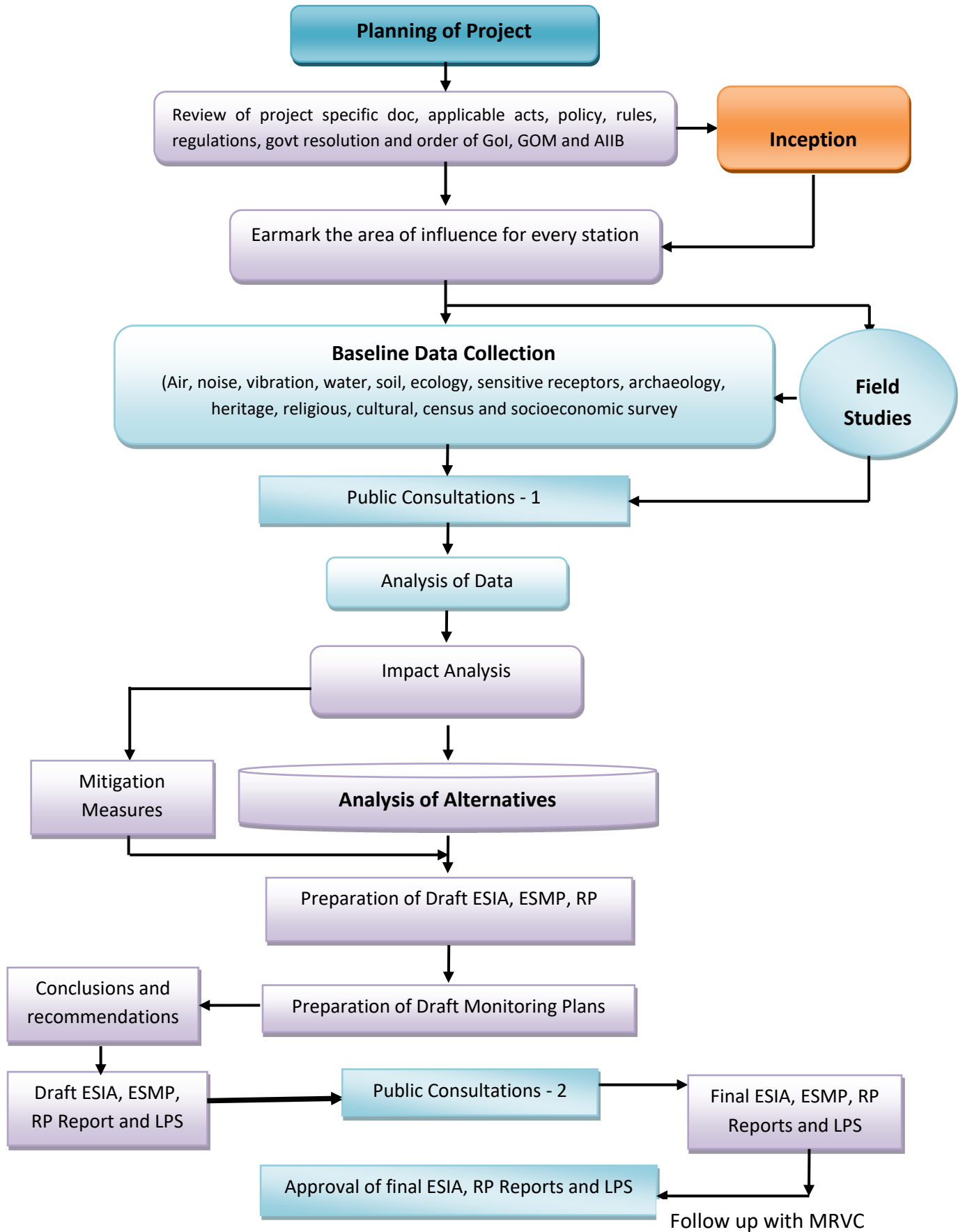
MRVC has provided data related to alignment and station development, which will form the basis for ESIA study. The consultant will review available other documents related to the project and project area to develop the understanding of the project including broad

technical aspects, the magnitude of impacts, laws governing land acquisition, census reports, etc.

The consultant will review all project specific documents such as DPR; General Arrangement Drawings of station development; ESIA & ESMP documents for different railway projects; and IFC EHS general guidelines and other Good International Industry Practice (GIIP). The consultant will also review the applicable policies, rules & regulations, and Acts of GoI, GoM, guidelines and directives of AIIB applicable to the project. Literature review and interaction with clients will form the basis for finalization of data collection tools and identification of key stakeholders. The following legislation will be consulted with a view to ensure compliance with various requirements.

- The Environment (Protection) Act, 1986
- The Environment (Protection) Rules, 1986
- The Wildlife (Protection) Act, 1972 and its amendments
- The Forest (Conservation) Act, 1980 and its amendments
- Air (Prevention & Control of Pollution) Act, 1981
- The Water (Prevention and Control of Pollution) Act, 1974
- The Water (Prevention and Control of Pollution) Cess Act, 1977
- Forest (Conservation) Rules, 2003 amended 2004
- The Ancient Monuments and Archaeological sites and Remains (Amendment and Validation Act), 2010
- Noise Pollution (Regulation and Control) Rules, 2000 and its amendments
- Solid Waste Management Rules, 2016, and its amendments
- Construction and Demolition Waste Management Rules, 2016, and its amendments
- Plastic Waste Management Rules, 2016, and its amendments
- E-Waste (Management) Rules, 2016, and its amendments
- Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016, and its amendments
- The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013, and its amendments
- Railways (Amendment) Act, 2008
- R&R Policy for Mumbai Urban Transport Project (MUTP)-III, 2018
- Climate Resilience Policy
- Maharashtra Government Decision on Direct Purchase, Revenue Department, Govt. of Maharashtra
- Maharashtra Felling of Trees (Regulation) Act, 1964
- AIIB's Environmental and Social Framework, 2019
- Other relevant Acts and Policies

Figure 1.2 Study Methodology



B. Field Visits and Reconnaissance Survey

An extensive field visits will be made at the proposed 17 stations to ascertain and record the Environmental and Social Features in the Project Area of Influence (Aoi):

- Environmental and Social Sensitive features,
- Environmental Monitoring Locations,
- Number and type of properties likely to be affected,
- Interact with some of the project affected persons to apprise them about importance of the project, identify stakeholders, type and significance of impacts and nature, expectations rehabilitation measures.

The consultant team will visit all potentially affected environmental and social features indicating their nature and types such as property/community structures (household structure, commercial and social structure, religious structure), archaeological sites, paleontological, historical, architectural, natural sites, educational, hospital, irrigation canal, infrastructure, agricultural farms, ponds, gardens, crops, and trees, etc during the field visit.

C. Data Collection

Baseline data will be collected from primary and secondary sources of the Study Area. The primary sources include site visits and field monitoring. The secondary sources include the documents from various government and non-government organizations including ESIA documents prepared for other railway projects. Baseline data for following aspects will be documented:

- Physical (Land, Climate, Soil, Air, Water, Noise and Vibration)
- Biological (Flora and Fauna – Terrestrial and Aquatic)
- Socio-Economic
- Cultural Resources

i. Physical

Land Environment: Information on physiography, geological features and seismicity of the project area will be collected from secondary sources. The existing land-use pattern of the area will be identified within 5 km on either side of the project corridor by secondary sources with respect to forest land, human settlements, water bodies, major habitat, sensitive places and strategic locations, sites of archaeological, historical, and cultural importance. In addition to field visits the information on topographical sheets, Census Handbooks or any other available information will also be utilized for the preparation of land use maps. The changed land-use pattern due to development with special reference to forest, settlement, ecologically sensitive areas, water bodies etc will be studied.

Meteorological: Data for temperature, relative humidity, wind speed, wind direction, wind rose, and rainfall shall be obtained from the nearest Meteorological station of the Meteorological Department (IMD).

Soil: Soils physical and chemical parameters will be studied from the available data in the existing report/literature. In addition, one soil sample from each station collected as per standard specification for their analysis.

Water: one water sample from each station collected from the ground water sources and surface water sources. These samples will be analysed and compared as per Indian standards. The secondary data, if any, would be studied and compiled.

Air Quality: Ambient air quality will be monitored to assess present baseline levels in the area. The parameters that will be monitored are PM₁₀, PM_{2.5}, SO₂, NO₂, CO. These samples will be analysed according to the method specified by Central Pollution Control Board (CPCB), IS: 5182. Ambient Air quality parameters will be compared with the National Ambient Air Quality Standards, 2009 (NAAQS). Ambient air quality monitoring will be carried out twice a week for 1 month at 17 locations.

Noise quality: Noise quality will be monitored to assess the existing noise levels of the project area. The parameters that will be monitored are L_{eq}, L₁₀, L₅₀, L₉₀, L_{max}, L_{min}, L_{day}, L_{night}, L_{DN}. Noise quality parameters will be compared with the Ambient Noise Standards, CPCB, 2000. The frequency of Noise monitoring will be for 24 hrs at each location.

Vibration: Vibration monitoring will be carried out to assess the existing Vibration levels of the project area. The frequency of Vibration monitoring will be 24 hrs at each location.

Air, noise, water, and soil sample test results will be compared with GoI, WHO or IFC standards whichever is more stringent.

ii. Biological

The ecological study will be conducted through site visit and secondary sources in the project AoI. The secondary sources may be published literature, academic research and documents brought out by Botanical / Zoological survey of India; data obtained from forest office etc. To identify the NOC requirement for Ecological aspects the AoI has been extended upto 10 km from the identified stations.

iii. Social Data Collection

Survey tools namely, questionnaire for census survey, questionnaire for socio-economic survey, checklist for inventory of properties, public consultation and focus group discussion etc. were developed and discussed with MRVC and AIB for incorporating suggestions and modifications.

Census Survey: The consultant carried out census survey by using a structured questionnaire. The purpose is to record the details of the occupants within the Area of Influence (Aoi) and the area required for proposed improvement of 17 stations. All structures including common properties and families that are likely to be affected by improvement of stations were identified and enumerated. The information gathered and recorded on a strip map and photography/videography were used to document existing structures, land holding and other impacts in project area.

Socio-Economic Survey: Two sets of data were collected through socio-economic survey. One relates to affected properties a) owned by individual persons / households and b) common properties. The enquiries aim at assessment of types and extent of damage in the form of loss of open land, homestead land, loss of living quarters and other physical infrastructures due to demolition of buildings, loss of commercial and business activities, loss of occupied land, loss of structure illegally constructed for dwelling or business, loss of tenant contract, loss of community facilities and utilities, social networks and social organization, cultural systems. The other set of enquiry aims at preparing socio-economic profile of the project affected people including demographic features like household size, age distribution, sex ratio, education and economic characteristics like occupation, household income and source of income, annual household expenditure, commercial/self-employment activities, employment pattern, opinion on resettlement and rehabilitation etc. Most part of the questionnaire was pre coded except those reflecting the opinion and views of the PAPs, which were left open ended.

Interview with Key Informants: The consultant first identified key informants in the project area and then conducted interview with them to collect valuable information on the proposed project.

Public Consultations and Focus Group Discussions: Public consultations and FGDs were conducted by the consultant through community meetings with PAPs as well as public area to identify the social and environmental concerns in project area. The consultation process involved various sections of affected persons such as traders, shop owners, residents, squatters, kiosks, daily passengers, student and working groups. The station masters, various government departments, CBOs (Community Based Organizations), auto and taxi drivers were consulted at 12 station locations across Central Western and Harbour line in Mumbai Suburban Railway. Special care was taken during the study to hold discussions with women group to elicit the adverse effects they will anticipate due to the project and their suggestions for mitigating the foreseeable adverse effects. Inputs from these consultations and discussions were considered in assessing the social impacts, designing Land Plan Schedule (LPS), RP, Gender Action Plan (GAP) and monitoring mechanism. The consultant documented the details of all consultation meetings with minutes of consultation, details of people attended the consultation and issues raised supported by photographs/videography.

Consultation with stakeholders like MRVC, Central/Western Railways, Mumbai Metropolitan Regional Development Authority (MMRDA), CPCB, Forest Department, BMC, concerned Departments of GoM, regulatory authorities and local communities shall be carried out after preparation of final ESIA report.

Recording of Alternative: Based on the information/data provided by DPR Consultant on behalf of MRVC, other alternatives like different station locations, design and technology option are considered while analysing the alternatives from social and environmental perspective.

Data Analysis: Both quantitative and qualitative data analysing methods will be used for presenting findings on Census and Socio-Economic status of PAPs. These include analysis of secondary data such as Census 2011 data, district statistical handbooks and other available from state departments and analysis (statistical and others) of primary data collected through various tools.

iv. Cultural Resources

Sensitive receptors such as property/community structures (household structure, commercial and social structure, religious structure), archaeological sites, paleontological, historical, architectural, natural sites, educational, hospital, irrigation canal, infrastructure, agricultural firms, ponds, gardens, crops, and trees etc will be identified within 200 m from project boundary.

D. Environment and Social Impact Assessment

Based on the project particulars and the existing environmental conditions, all potential impacts would be identified that are expected because of the proposed project and wherever possible, these will be quantified. The consultant will also assess significant positive and negative impacts, direct and indirect impacts, immediate and long-term impacts, unavoidable or irreversible impacts. These impacts would be assessed for various phases of project cycle namely, location & design, construction, and operation. The standard methodology will be adopted for impact prediction and assessment. The likely impacts that will be considered are as under:

❖ Impact due to Project location & design

- Loss of forest
- Encroachment into forest lands and loss of forest produce
- Encroachment into natural reserves
- Effect on water resources inside and outside the project
- Climate Risk
- Loss of historical and cultural monuments
- Loss of land
- Loss of Building/structures

- Impact on Families & Persons
- Impact on Vulnerable Groups
- Impact on Business & Livelihood Activities
- Impact on Women
- Loss of Community Assets & Cultural Resources
- Loss of Infrastructure & Public Amenities
- Employment loss of Wage Earner
- Green Building Features

❖ **Impact due to Project construction**

- Soil and water pollution at construction sites
- Air and noise pollution
- Impact due to Muck Disposal
- Impact due to Hazardous waste
- Impact on water supply, sewage disposal and solid waste management due to labour camp
- Soil erosion and land subsidence
- Water and Energy Consumption
- Impact due to supply of construction material
- Impact due to construction/demolition waste
- Occupational Safety and Health
- Labour Welfare

❖ **Impact due to Project operation**

- Reduction in Travel time
- Noise and Vibration impact
- Energy demand
- Employment opportunities
- Improved infrastructure
- Occupational Safety and Health

E. Environment and Social Management Plan

An environmental management plan would be developed to mitigate the adverse impacts during construction and operation phases of the project. The strategy would include evaluation of alternative methods to reduce or eliminate adverse impacts of the most critical areas likely to contribute to the most significant environmental burdens. The Environmental and Social Management Plan (ESMP) would specifically highlight the proposed mitigation measures to be implemented during Project design, construction, and operation phases.

F. Environment and Social Monitoring Plan

Environment and social monitoring plan would be developed to monitor the environmental and social attributes during construction and operation phase at sensitive locations as

identified during baseline study. Monitoring and Evaluation plan for implementation of RP would be developed.

G. Environment and Social Cost Estimate

The preliminary cost estimates have been prepared for all the measures proposed and for implementation of monitoring plan. R&R cost estimate has been developed based on Entitlement Matrix prepared for MUTP-III projects, August 2018.

H. Preparation of Draft ESIA Report

As per the requirement of the proposed project and land record survey, a land requirement/acquisition report is being prepared. Environmental and Social Impact Assessment Report including RP has been prepared based on the findings of impact & its mitigations, land plan schedules, census and socio-economic survey, public consultations, and focus group discussions. The draft ESIA including RP report consist of baseline environment, socio-economic, analysis of potential impacts, public consultation and disclosure, policy and legal framework, entitlement matrix, institutional arrangement, relocation and resettlement, income restoration, gender action plan, stakeholder engagement plan, grievance redress mechanism, implementation schedule and organizational responsibilities, monitoring and cost estimate. The consultant will give a presentation on ESIA report to the client.

I. Preparation of Final ESIA Report

All comments and suggestions received during public consultation, from MRVC and AIIB will be addressed depending upon their applicability in the final ESIA report and the same will be submitted to the MRVC.

1.7 Structure of Report

The structure of the Environmental & Social Impact Assessment (ESIA) Report is as under **Table 1-2**.

Table 1-2: Structure of ESIA Report

Chapter No.	Title of Chapter
I	Executive Summary
1.	Introduction
2.	Policy, Legal and Administrative Framework
3.	Project Description
4.	Environment and Social Baseline
5.	Environment and Social Risk and Impact Analysis
6.	Environment and Social Management Plan
7.	Occupational Health and Safety
8.	Analysis of Alternatives

9.	Public Consultations and Information Disclosure
10.	Grievance Redress Mechanism
11.	Conclusion and Recommendation

CHAPTER 2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 Environmental and Social Policy Framework

The environmental and social policy framework include existing institutions and legislations relevant to the project at the International, National and State levels. The various statutory clearances/ permissions required from state and central government authorities and administrative framework are discussed in the subsequent section.

2.2 Legal Framework

The proposed project would be governed by various Acts, Rules and regulations set by the Ministry of Environment, Forests and Climate Change (MoEFCC) at the Central level and other regulatory agencies at the State and local level. Various environmental and social standards, specifications, and guidelines of Central Pollution Control Board (CPCB) and state level agencies will also be applicable.

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

The Acts, Rules and Notifications applicable to environmental and social aspects of the constructional and operational phases of the proposed project are summarized and briefly described in the **Table 2-1** below.

Table 2-1: Key Applicable Environmental and Social Legislations

LEGISLATION	ACTIVITY / FEATURE
Environment (Protection) Act, 1986 amended 1991. Environment (Protection) Rules, 1986	<ul style="list-style-type: none"> • Overall Environmental Protection • Compliance to environmental (Air, Water, Noise) Standards
Air (Prevention and Control of Pollution) Act, 1981 amended in 1987. Air (Prevention and Control of Pollution) Rules, 1981	<ul style="list-style-type: none"> • Protection of Air Quality • Consent to Establish (CTE) for establishing and • Consent to Operate (CTO) for activities causing air pollution • Compliance to National Ambient Air Quality Standards
Water (Prevention and Control of	<ul style="list-style-type: none"> • Protection of Water Quality

LEGISLATION	ACTIVITY / FEATURE
Pollution) Act, 1974 amended in 1988. Water (Prevention and Control of Pollution) Rules, 1975	<ul style="list-style-type: none"> • Discharge of sewage from project • Obtaining No Objection Certificate (NOC) for establishing and • Consent to Operate for activities causing water pollution from SPCB
EIA Notification 2006 and its amendments <i>(Amendment of Integration of environmental Conditions in local building bye laws for residential buildings only).</i>	<ul style="list-style-type: none"> • For getting Environmental Clearance (PROJECT DOES NOT ATTRACT ENVIRONMENTAL CLEARANCE) • Integration of environmental Conditions in local building byelaws
Noise Pollution (Regulation and Control) Rules, 2000 amendment in 2010	<ul style="list-style-type: none"> • Compliance with Ambient Noise Standards in accordance with land use of the area
Hazardous and Other Wastes (Management, and Trans boundary Movement) Rules, 2016	<ul style="list-style-type: none"> • Handling, storage, treatment, and disposal of hazardous material (fuel)/ waste like waste oil and lubricants etc.
Solid Waste Management Rules, 2016	<ul style="list-style-type: none"> • Management (Collection, Handling, Storage, and disposal) of solid waste
Plastic Waste Management (amendment) Rules 2018 and its amendments	<ul style="list-style-type: none"> • Management of Plastic waste
E waste (Management) Rules 2016 and its amendments.	<ul style="list-style-type: none"> • Management of E waste
Construction and Demolition Waste Management Rules, 2016	<ul style="list-style-type: none"> • Management of waste resulting from construction, re-modeling, repair and demolition of any civil structure
Maharashtra Regional and Town Planning Act, 1966	<ul style="list-style-type: none"> • Permits and sanction for land • Develop the project in accordance with Land use and Master plans
Forest (Conservation) Act 1980 amended in 1988; Forest (Conservation) Rules 2003	<ul style="list-style-type: none"> • Clearances from forest department • Conservation of forest • Regulating Access to Natural Resources
Indian Wildlife Protection Act, 1972, amended in 2002	<ul style="list-style-type: none"> • Protection of animals and specified plants
Coastal Regulation Zone Rules 2019	<ul style="list-style-type: none"> • Coastal Regulation Zone Rules 2019 makes it mandatory to obtain prior CRZ clearance for projects or activities proposed in Coastal Regulation Zone.
The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 with Ancient Monuments and Archaeological Sites and Remains (Amendment) Act, 2017.	<ul style="list-style-type: none"> • Preservation of ancient and historical monuments and archaeological sites and remains of national importance. To regulate the archaeological excavations and protection of sculptures, carvings etc.

LEGISLATION	ACTIVITY / FEATURE
	<ul style="list-style-type: none"> Construction of public works in prohibited area of protected monuments is permitted.
Heritage Regulations for Greater Bombay 1995	<ul style="list-style-type: none"> The heritage structures which are located within proposed right of way are required permission from Municipal Commissioner Heritage upon recommendations of Heritage Conservation Committee
Wetlands (Conservation and Management) Rules 2010 and Wetlands (Conservation and Management) Rules 2017	<ul style="list-style-type: none"> Conservation and Management of wetlands. The 2017 rules are in supersession of 2010 rules and apply to Ramsar wetlands and wetlands notified by Government (s) but do not apply to the wetland falling in areas covered under the forest Act, wildlife Act, the State Forest Acts and CRZ Act.
Indian Treasure Trove Act, 1878, modified up to the 01/09/1949	<ul style="list-style-type: none"> Procedure to manage chance finds
The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	<ul style="list-style-type: none"> Hours of Work, Welfare Measures, Safety and Health Measures
The Maharashtra Felling of Trees (Regulation) Act, 1964 The Maharashtra (urban areas) protection and preservation of tree Act, 1975	<ul style="list-style-type: none"> Protection and preservation of trees Permission for tree cutting/felling and transplantation
The Maharashtra Jeevan Authority Act, 1976 amended in 2013	<ul style="list-style-type: none"> To develop and regulate water supply and sewerage services in the State of Maharashtra Water supply for domestic purposes shall not to be used for non-domestic purposes
Bombay Provincial Municipal Corporation Act, 1949	<ul style="list-style-type: none"> Establishment of Municipal Corporations for certain cities in the Province of Bombay Water for domestic purposes shall not be used for other purposes.
Maharashtra Ground Water (Development and Management) Act, 1993	<ul style="list-style-type: none"> To control overexploitation of ground water resources To protect public drinking water sources.
Railway Amendment Act, 2008	<ul style="list-style-type: none"> It has been prepared for execution of a special railway project It will only applicable if this project is considered under special railway project
Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013	<ul style="list-style-type: none"> The Act aims to establish the law on land acquisition, as well as the rehabilitation and resettlement of those directly affected by the land acquisition in India. The scope of the Act includes all land acquisition

LEGISLATION	ACTIVITY / FEATURE
	whether it is done by the Central Government of India, or any State Government of India.
RFCTLARR (Maharashtra) Act,2013	<ul style="list-style-type: none"> The Revenue and Forest Department of the Maharashtra will follow the market value of Maharashtra Government and will follow multiplication factor.
Government Resolution-MRD-3318.C.R.06 (Part 2)/UD-7dated 5th Dec2018	<ul style="list-style-type: none"> Mumbai Metropolitan Region Development Authority (MMRDA) will rehabilitate the project affected people of MUTP 3.
R&R Policy for MUTP-III,2018 (Government Resolution: MRD-3317/S.N.15/UD-7 dated 20th MUTP3A.	<ul style="list-style-type: none"> Policy for land acquisition and the details and components of the compensation is addressed in this policy for the project.
Maharashtra Government Decisions No. SANKIRNA-03/2015/Para.Kra.34/A-2/dated 12th May 2015 and SANKIRNA-03/2015/Para.Kra.34/A-2/dated 30th Sep.2015 of Revenue &Forest Department, Government of Maharashtra	<ul style="list-style-type: none"> Acquisition of private land for irrigation and other projects by negotiation through direct purchase method. Principles and procedures for the land Acquisition is addressed.
AIB's Policies on Environmental and Social Framework,2019	<ul style="list-style-type: none"> It sets out the general processes and requirements for project screening and categorization, environmental and social due diligence, environmental and social assessment, environmental and social management plans, environmental and social assessment tools and management plan framework, information disclosure, public consultation, monitoring and reporting as well as grievance redress.

Other Acts and policies, which may be relevant to the proposed project are:

- a) Minimum Wages Act, 1948
- b) Contract Labour Act, 1970
- c) The Bonded Labour System (Abolition) Act, 1976
- d) Child Labour (Prohibition and Regulation) Act 1996 along with Rules, 1998
- e) Children (Pledging of Labour) Act, 1933 (as amended in 2002)
- f) The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995
- g) The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Rules, 1955
- h) The Scheduled Caste and the Scheduled Tribes (Prevention of Atrocities) Act, 1989
- i) The Scheduled Caste and the Scheduled Tribes (Prevention of Atrocities) Rules, 1995

j) Right to Information Act, 2005

2.2.1 FOREST RIGHT ACT, 2006 ENVIRONMENT PROTECTION ACT

The Act is for the purpose of protecting and improving the quality of the environment and preventing, controlling, and abating environmental pollution. Protect and improve environment under this Act by:

- Planning and execution of a nation-wide programme for the prevention, control, and abatement of environmental pollution.
- Laying down standards for the quality of environment in its various aspects.
- Laying down standards for emission or discharge of environmental pollutants from various sources whatsoever.
- Restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards.
- Laying down procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents.
- Laying down procedures and safeguards for the handling of hazardous substances.

No person carrying on any industry, operation or process shall discharge or emit or permit to be discharged or emitted any environmental pollutant more than such standards as may be prescribed.

2.2.2 WATER AND WATER POLLUTION

The use of water resources and the discharge of polluted water (sewerage) are primarily regulated by the Water (Prevention and Control of Pollution) Act, 1974 amended in 1988. The Water Cess Act, 1977 amended in 1992 and 2003, including Rules 1978 and 1991 provides for levy and collection of Cess on water consumed with a view to generate resources for prevention and control of water pollution. The Act assigns functions and powers to the Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCBs) for prevention and control of water pollution.

The Environment (Protection) Act 1986 amended in 1991 and Rules also lays down specific standards for quality of water effluents to be discharged into different type of water bodies (sewers, surface water bodies like lakes and rivers, marine discharge). Additionally, the water supplied to users for drinking shall also conform to the National Drinking Water Standard; IS-10500 (**Annexure 2.1**). The general standards for discharge effluent in Inland Surface Water Bodies are given at **Annexure 2.2**. Tolerance limits for Inland Surface Water Quality are given at **Annexure 2.3**.

The Central Ground Water Board (CGWB) the statutory authority set up by the Central Government has also restricted the drilling of tube wells and bore wells in certain water scarce areas in the country.

2.2.3 AIR QUALITY

The Air (Prevention and Control of Pollution) Act, 1981 and amended in 1987 including Rules 1982 and 1983 was enacted to prevent, control and reduce air pollution. According to Section 21 of the Act, no person shall establish or operate any activity, which can cause air pollution without obtaining Consent to Establish (CTE) as per the Air Act. The Act also lays down national ambient air quality standards for pollutants like PM10, PM2.5 Sulphur dioxide, Nitrogen dioxide, Carbon monoxide, Lead, Ozone, Ammonia, Benzene and Benzo pyrene, Arsenic and Nickel with the intent of managing air quality for different category of areas (Industrial, Residential, Rural and Ecological sensitive areas). Ambient Air Quality Standards have been notified by the CPCB vide Gazette Notification dated 16th November 2009, are given at **Annexure 2.4**.

2.2.4 NOISE QUALITY

With the objective of regulating ambient noise quality in the environment, the Central Government has notified the Noise Pollution (Regulation and Control) Rules, 2000 amended in 2010 under the EPA. The noise standards for different category of areas are based on the weighted equivalent noise level (Leq). The notified ambient noise standards are presented in **Annexure 2.5**.

2.2.5 SOLID WASTE MANAGEMENT

Construction and Demolition Waste Management Rules, 2016 identify roles of waste generator, service provider, local authorities, SPCB, State Government, CPCB, BIS and Central Government. The Rules specify procedure for reporting accidents during waste processing or treatment or disposal, roles and criteria for site selection for storage and processing or recycling facilities, applications of waste made from waste materials.

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 specify the following:

- Occupier`s responsibility for safe and environmentally sound management of hazardous and other wastes in terms of sending or selling to an authorised actual user or disposal in an authorised disposal facility.
- Responsibilities of State Government,
- Rules for grant of authorization to manage wastes and for utilization of wastes.
- Roles of waste processor and State Government in treatment, storage, and disposal facility for hazardous and other wastes.
- Procedures for packaging, labelling, and transport of hazardous and other wastes.

Solid Waste Management Rules, 2016 are applicable to every domestic, institutional, commercial and any other non-residential solid waste generator except industrial waste, hazardous waste, hazardous chemicals, bio medical wastes, e-waste, lead acid batteries and radio-active waste. Duties of waste generators, manufacturers, local authorities, various Officers and Ministries of Government, Pollution Control agencies are stipulated in these Rules.

2.2.6 THE ANCIENT MONUMENTS AND ARCHAEOLOGICAL SITES AND REMAINS ACT, 2010

The Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 has been enacted to amend the Ancient Monuments and Archaeological Sites and Remains Act, 1958 and to make provision for validation of certain actions taken by the Central Government under the said Act. The act has come into force on January 23, 2010.

The Act states that the limits of prohibited area and regulated area around the monuments, archaeological sites and remains declared by the Central Government as protected have been specified in the principle Act as 100 m and 200 m respectively. The limits so fixed may be further extended on the basis of gradation and classification of the monuments, archaeological sites and remains to be done by the National Monuments Authority, which is to be constituted by the Central Government by virtue of the Amendment in the principle Act. The Act defines regulated area and prohibited area as follows:

Prohibited Area: It is the area beginning at the limit of the protected area or the protected monument declared as of national importance and extending to a distance of 100 m in all directions. There is also a provision in the Act to further extend the prohibited area beyond 100 m having regard to the classification of any protected monument or protected area on the recommendation of National Monument Authority by the Central Government.

Regulated Area: It is the area beginning at the limit of the prohibited area in respect of every protected archaeological monument/site and remains and extending to 200 m in all directions. This 200 m regulated area could further be extended having regard to the classification of any protected monument or protected area on the recommendation of National Monument Authority by the Central Government. The regulated area has extent not only horizontally but also vertically and covers even below the surface.

The Act provides that in exceptional cases where Central Government or DG/ASI is satisfied that the works/project is in public interest and does not have significant adverse impact on the monument/site, permission can be granted for such work in prohibited area. The Act provides that none other than an archaeological officer can carry out any construction in any prohibited area. The Act provides that no permission, including carrying out any public work or project essential to the public or other constructions, shall be granted in any

prohibited area on and after the date on which the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 comes into force.

Amendment to this Act vide The Ancient Monuments And Archaeological Sites And Remains (Amendment) Bill, 2017 defines “public works” to mean construction works related to infrastructure financed and carried out by any department or offices of the Central Government for public purposes which is necessary for the safety or security of the public at large and emergent necessity is based on specific instance of danger to the safety or security of the public at large and there is no reasonable possibility of any other viable alternative to such construction beyond the limits of the prohibited area. The Bill 2017 states that the clause in Act 2010 which barred permission to construct in prohibited area shall not apply to the public works.

2.2.7 HERITAGE REGULATIONS FOR GREATER BOMBAY 1995

No development or redevelopment or engineering operation or additions / alterations, repairs, renovations of the listed buildings or listed precincts or listed natural feature areas shall be allowed except with the prior permission of Commissioner, Municipal Corporation /Vice Chairman, Development Authority. All development in areas surrounding Heritage assets of a particular Grade shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage assets of equal Grade.

2.2.8 WETLANDS (CONSERVATION AND MANAGEMENT) RULES 2010 WITH AMENDMENT

The wet land (Conservation and Management rule) 2017 rules supersede the wet land 2010 rules and apply to Ramsar wetlands and wetlands notified by Government (s) but do not apply to the wetland falling in areas covered under the forest act, wildlife act, Indian forest act and CRZ act.

As per rule 2017 State wet land authorities are empowered to demarcate wetlands in addition to certain other duties. However, granting permission for regulated activities is not among these duties. It needs to be clarified from Central wetland authority whether such permission will be granted by State wetland authority or Central wetland authority.

2.2.9 COASTAL REGULATION ZONE RULES 2019

Coastal Regulation Zone Rules 2019 makes it mandatory to obtain prior CRZ clearance for projects or activities proposed in Coastal Regulation Zone.

2.2.10 THE BUILDING AND OTHER CONSTRUCTION WORKERS ACT, 1996

The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 aims to provide for regulation of employment and conditions of service of the building and other construction workers as also their safety, health and welfare

measures in every establishment which employs or employed ten or more workers. The provisions in the Act for health and safety measures for the construction workers are in conformity with International Labour Organisation Convention.

2.2.11 THE MAHARASHTRA JEEVAN AUTHORITY ACT, 1976

The Act is to provide for establishment of a Jeevan Authority for rapid development and proper regulation of water supply and sewerage services in the State of Maharashtra. The supply of water for domestic purposes under this Act means supply for any purpose, except for building purposes, including construction of streets. Water supply for domestic purposes shall not to be used for non-domestic purposes under this Act.

2.2.12 BOMBAY PROVINCIAL MUNICIPAL CORPORATION ACT, 1949

This Act is to provide for the establishment of Municipal Corporations for certain cities in the Province of Bombay with a view to ensure a better municipal government. Under this act, "water for domestic purposes" shall not include water for cattle, or for horses, or for washing vehicles, when the cattle, horses or vehicles are kept for sale or hire, or by a common carrier, and shall not include water for any trade, manufacture, or business, or for building purposes, or for watering gardens, or for fountains or for any ornamental or mechanical purposes.

2.2.13 POLICY STATEMENT FOR ABATEMENT OF POLLUTION, 1992

The objective is to integrate environmental considerations into decision making at all levels. Steps have to be taken to achieve this are:

- Prevent pollution at source.
- Encourage, develop, and apply the best available practicable technical solutions.
- Ensure that the polluter pays for the pollution and control arrangements.
- Focus protection on heavily polluted areas and river stretches; and
- Involve the public in decision making

To achieve the objectives maximum use will be made of a mix of instruments in the form of legislations and regulation, fiscal incentives, voluntary agreements, educational programmes, and information campaigns. The emphasis will be on increased use of regulations and an increase in the development and application of financial incentives.

2.2.14 NATIONAL ENVIRONMENT POLICY, 2006

National Environment Policy 2006 is a response to India's national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), (DPSP) strengthened by judicial interpretation of Article 21.

The existing policies have recognized the need for sustainable development in their specific contexts and formulated necessary strategies to give effect to such recognition. The National Environment Policy seeks to extend the coverage, and fill in gaps that still exist, considering present knowledge and accumulated experience. It does not displace but builds on the earlier policies. The objectives of the National Environmental Policy are:

- Conservation of Critical Environmental Resources
- Intra-generational Equity: Livelihood Security for the Poor
- Inter-generational Equity
- Integration of Environmental Concerns in Economic and Social Development:
- Efficiency in Environmental Resource Use
- Environmental Governance
- Enhancement of Resources for Environmental Conservation

The policy focuses on encouraging the regulatory authorities, Central and State, to institutionalize regional and cumulative environmental impact assessments to ensure that environmental concerns are identified and addressed at the planning stage itself. The policy adopts the civil liability for environmental damage that would deter environmentally harmful actions and compensate the victims of environmental damage.

2.2.15 RAILWAYS (AMENDMENT) ACT, 2008

The Railways Act, 1989, which combines and amends the law relating to Railways, was further amended in 2008. This Act is called The Railways (Amendment) Act, 2008 (RAA 2008). The RAA 2008 has been prepared for execution of a special railway project, notified as such by the Central Government from time to time, to provide national infrastructure for a public purpose in a specified timeframe, covering one or more states or Union territories. The RAA 2008 may not be applicable for MUTP-III. But, if the MUTP-III project is declared as special railway project by respective authority, then the RAA 2008 will be applicable in MUTP-III. The main elements of the RAA 2008 act are provided in the Table 2-2.

Table 2-2: Main elements of the Railways (Amendment) Act 2008

Section		Description
20A	Power to acquire land	Declaration of intention to acquire land required for execution of a special railway project. This is the first notification and empowers the competent authority to trigger the substance of the notification
20D	Hearing of objections etc.	Objections are to be made by the interested persons within 30 days from the date of publication of the notification under sub-section (1) of section 20A.
20E	Declaration of acquisition	After the publication of the declaration under subsection (1), the land shall vest absolutely with the Central Government free from all encumbrances.

Section		Description
20F	Determination of amount payable as compensation	Amount to be paid as compensation shall be declared by an order of the competent authority. The competent authority shall make an award under this section within a period of one year from the date of publication of the declaration.
20F (6)	Arbitrations	If the amount determined is not acceptable to either of the parties, they can ask for arbitration and an arbitrator shall be appointed for this purpose.
20G	Criterion for determination of market value of land	(i) The minimum land value, if any, specified in the Indian Stamp Act, 1899 for the registration of sale deeds in the area, where the land is situated; or (ii) the average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than 50% of the sale deeds registered during three years, where higher price has been paid, whichever is higher
20I	Power to take possession	To surrender or deliver possession thereof to the competent authority or any person duly authorized by it in this behalf within a period of 60 days of the service of the notice
20N	Land Acquisition Act 1 of 1894 not to apply	Nothing in the LA Act, 1894 shall apply to an acquisition under this Act.
20O	Application of the National Rehabilitation and resettlement Policy (NRRP), to persons affected due to land acquisition	The Provisions of the NRRP, 2007 for the project affected families, notified by the Government of India in the Ministry of Rural Development vide number F.26011/4/2007-LRD, dated 31st October, 2007

2.2.16 RFCTLARR ACT 2013

The RFCTLARR Act repeals the Land Acquisition Act, 1894 and is applicable to all states in India (except the State of Jammu and Kashmir). RFCTLARR, 2013 is a first national/central law that addresses land acquisition and rehabilitation and resettlement. This Act provides enhanced compensation as compared to earlier LA Act of 1894 and resettlement & rehabilitation assistance. It provides enhanced compensation (factor of 2 in rural areas and a factor of 1 in urban areas).

The Act lays down procedures for providing resettlement & rehabilitation assistance, fair compensation of the affected families (and not just the titleholders) due to land acquisition, rehabilitation, and resettlement. Some of the key features include the following: (i) Preliminary investigations/preparation of Social Impact Assessment (SIA) and prepare a Social Impact Management Plan (SIMP). (ii) Preliminary notification stating: project/ public

purpose; reasons necessitating land acquisition; summary of SIA; and particulars of the Administrator appointed for the purpose of rehabilitation and resettlement; receipt of objections and hearing after the approval of SIA and within 12 months from the date of SIA approval; (iii) Preparation of Rehabilitation and Resettlement scheme and its declaration by the District Collector after the same is approved by the Commissioner-Rehabilitation and Resettlement; (iv) Public notice and award of compensation and R&R assistances by District Collector (DC) within a period of twelve months from the date of the award publication. The aims and objectives of the Act are as follows:

- i. To ensure, gentle, participative, informed and transparent process for land acquisition.
- ii. Provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or already affected by such acquisition.
- iii. Make adequate provisions for affected persons for their rehabilitation and resettlement.
- iv. Ensure that outcome of obligatory acquisition should be such that the affected persons become partners in development activities, which would lead to an improvement in their post-acquisition social and economic status.

2.2.17 RFCTLARR (MAHARASHTRA) ACT 2013

The Revenue and Forest Department of the Maharashtra through Notification No. LQN. 12/2013/C.R. 190/A-2 dated 27th August 2014 on the RFCTLARR Act 2013, and notified the following:

- a) The market value of land to be followed in the State of Maharashtra.
- b) The Multiplication factor to be followed.
- c) Components of the Rehabilitation and Resettlement components.
- d) Increment of 5% per annum on the unit amount of Assistance provided in the RFCTLARR Act 2013

2.2.18 GOVERNMENT RESOLUTION: MRD-3318/C.R. 06 (PART 2)/UD-7 DATED 5TH DEC 2018

The Urban Development Department of the Government of Maharashtra through Government Resolution No. MRD-3318/CR 06 (Part-2)/UD-7 dated 5th December 2018 issued the decision taken by the Govt. of Maharashtra on the projects under MUTP 3 and MUTP 3A, and decided the following particularly in connection with R&R policy:

- a) The rehabilitation policy for the project affected people as per Government Resolution No. Project-1700/CR-31/Slum-2 dated 12th Dec 2000 (section-1700/CR-31/ slum-2 dated 12-12-2000) issued for rehabilitation of MUTP-I and MUTP-II, is applicable for R&R of PAPs of MUTP 3 & MUTP 3A projects. **(Annexure- 2.6)**
- b) Mumbai Metropolitan Region Development Authority (MMRDA) will rehabilitate the

project affected people of MUTP 3.

- c) For R&R of PAPs under MUTP 3, if the premises are not available in MMRDA's jurisdiction, then it is allowed to pay the lump sum amount to PAPs (encroachers) as per guidelines of UDD GR No. CMP-2017/CR-23/UD-26 dated 13th June 2018.
- d) MUTP rehabilitation policy will be applicable for private land PAPs under MUTP 3 and MUTP3A.

2.2.19 R&R POLICY FOR MUTP-III, 2018 (GOVERNMENT RESOLUTION: MRD-3317/S.N. 15/UD-7 DATED 20TH AUG 2018)

The Urban Development Department of the Government of Maharashtra issued order that rehabilitation of Project Affected Persons under MUTP 3 will be done by Mumbai Metropolitan Region Development Authority vide Government Resolution No. MRD3317/SN 15/UD-7 dated 20th August 2018 and decided the following:

- a) Government Policy for taking possession of encroached Government land required for MUTP-III project by making onetime payment of cost of construction to PAPs issued vide Government Resolution of Urban Development Department of Government of Maharashtra no. Champa-2017/Pra.Kra.23/Navi-26 dated 13th June 2018, (Maharashtra Govt. Municipal Development Department Govt. No. Mank Champa-2014 / 7.79.23 / Nov-26, dated June 13, 2014), is applicable for rehabilitation of PAPs whole project area of MUTP-III. It further states all terms and conditions under Para A and General conditions of Urban Development Department of Government of Maharashtra GR no. Champa2017/Pra.Kra.23/Navi-26 dated 13th June 2018 is applicable for rehabilitation of PAPs of MUTP-III.
- b) Salient features of GR No. (Champa-2014 / 6.79.2 / nv-26, dated 13 June 2014) of Urban Development Department of Government of Maharashtra:
 - The government land required for Central and State Government vital projects in urban area if encroached upon, encroachers are entitled for protection, while displacing them following guidelines are to be followed by concern agencies:
 - In Municipal Corporation Area, the person encroached on the Government land otherwise who are eligible for regularized should be given flat of 269 sq. Ft. area free of cost in corporation area. In case of non-availability of free of cost house, such eligible encroachers should be compensated by the house price in cash as per the prevailing annual ready reckoner rate.
 - In Municipal Council/ Nagar Panchayat Area, the eligible encroacher on the Government land, should be provided flat of 300 sq. Ft. area free of cost within the boundaries of Corporation/ Nagar Panchayat or within 5 kms of the boundaries of Corporation/ Nagar Panchayat. In case of non-availability of free of cost flat/house, such encroachers should be compensated in cash by the current price of the house as per the prevailing annual ready reckoner rate.

- If encroacher of their encroachment is not entitling for regularization as per rule in that case, no compensation to be paid.
- The family holding separate ration card on 1stJan 2018 or before that, should be deemed as separate family.
- In case, if more than one family are living in one hutment on 1stJan 2018 or before, and they are holding separate ration card, then every such family should be treated as eligible for house/ land/ construction expense or cash compensation.

2.2.20 MAHARASHTRA GOVERNMENT DECISION ON DIRECT PURCHASE

A. The Government Decision No. SANKIRNA-03/2015/Para. Kra. 34/A-2 dated 12th May 2015, Revenue & Forest Department, Govt. of Maharashtra

Generally, for a different project, the private land required, is acquired as per the prevailing Land Acquisition Act by concerned Land Acquiring Institution. However, if the land required by Land Acquiring Institution is acquired by direct purchase method instead of acquiring as per Land Acquisition Act which is not prohibited through direct purchase method it shall be done considering following directive principles:

- a) Directive Principle – Land required for new projects other than irrigation project. While acquiring land through direct purchase method, land shall be acquired for the entire project.
- b) District level committee for deciding compensation – A committee shall be constituted under the Chairmanship of Collector to decide the rate of land being acquired through direct purchase method. The committee shall comprise the following:
 1. District Collector – Chairman
 2. Superintending Engineer Irrigation – Member
 3. Superintending Engineer PWD – Member
 4. District Government Pleader – Member
 5. Assistant Director of Town Planning – Member
 6. Competent Authority of acquiring body – Member
 7. Concerned Deputy Collector (Land Acquisition) – Member
 - i. In addition to this as per requirement for exercising valuation of trees/ fruit trees/ forest trees/ standing crops, construction & other amenities, competent person or specialist of the related subject from Agriculture, Forest, Gardening etc. shall be included as invitee member.
 - ii. Above mentioned committee, before deciding the compensation of land, will verify the valuation of land as per land acquisition act in force, documentation regarding the original owner of land & legal search report of land through Govt. Pleader.

- c) Procedure for deciding compensation – For projects while acquiring the land through direct purchase method, the amount of compensation shall be calculated as per the provision of Article No. 26 to 30 of Land Acquisition Act 2013 & Schedule I, including other related features, then 25% should be added to the above-calculated compensation.
- d) Options to farmers while accepting the compensation – Following two options shall be offered to farmers while acquiring the land through direct purchase method for a project.
 - 1. Paying complete compensation as calculated vide (c) above at one time.
 - 2. (a) While purchasing land/ taking over land 50% amount will be paid at the first stage out of whole compensation.
(b) Remaining 50% amount will be paid as annuity.

B. The Government Decision No. SANKIRNA-03/2015/Para. Kra. 34/A-2 dated 30th Sept. 2015, Revenue & Forest Department, Govt. of Maharashtra

The Govt. Decision No. SANKIRNA-03/2015/Para. Kra. 34/A-2 dated 12 May 2015 was amended on 30th September 2015 in view of difficulties faced in processing the land acquisition of private land for irrigation and other projects.

- a) Directive Principles: Sr. No. 2 was amended “which are related to irrigation projects covering both new projects as well as incomplete projects”.
- b) District level committee for deciding compensation:
In Sr. No. (i) for invitee member – Districts where Superintending Engineer Post of Irrigation/ PWD Dept. is not available, the concerned Chief Engineer shall authorize the Superintending Engineer of adjacent district. In Sr. No. (ii) “Advocates on a panel of Acquiring Institution” has been added after through Govt. Pleader.
- c) Procedure for deciding compensation – “For Project ... then 25% should be added on the above-calculated compensation” thereafter “while considering market value as per Land Acquisition Act article 26(1), the average of sale deeds for preceding 3 years shall be taken. In the column of purchase and Index-2 shall reflect all the components considered for deciding the compensation package independently (market rate, amount as per notified multiplying factor, compensation against assets connected with the land, solatium, 25% additional compensation due to consent for Direct Purchase Method etc.). While deciding the market value for further purchases the amount of market value included in the compensation package as per Land Acquisition Act 2013 shall only be considered, other components (Amount as per notified multiplying factor, compensation against assets connected with the land, solatium, 25% additional compensation on land valuation due to consent for Direct Purchase) shall not be considered.

2.3 AIIB Environmental and Social Framework (ESF)

The Environmental and Social Framework are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP).

2.3.1 ASIAN INFRASTRUCTURE INVESTMENT BANK (AIIB) ENVIRONMENTAL AND SOCIAL POLICY

The AIIB Environmental and Social Policy applies to project funded by the Bank and sets out the general processes and requirements for project screening and categorization, environmental and social due diligence, environmental and social assessment, environmental and social management plans, environmental and social assessment tools and management plan framework, information disclosure, public consultation, monitoring and reporting as well as grievance redress. It also defines the roles and responsibilities between the Bank and the clients. The Policy must be complied with to secure Bank financing.

Environmental and Social Standard 1 - Environmental and Social Assessment and Management: This standard requires clients/borrowers to implement environmental and social assessment and management, using appropriate studies proportional to potential risks and impacts. It requires that the assessment process be supported by effective information disclosure and consultation with a grievance mechanism in place and the scope of the assessment should include pollution prevention, biodiversity impacts, resource efficiency, climate change, sustainable use of natural resources, vulnerable groups, access to resources, impacts on livelihood, resettlement, cultural resources, working conditions, and community health and safety.

Environmental and Social Standard 2 - Involuntary Resettlement: This Standard aims to avoid involuntary resettlement wherever possible; to minimize Involuntary Resettlement by exploring Project alternatives, where avoidance is not feasible, to enhance or at least restore, the livelihoods of displaced persons in real terms relative to the pre-project Levels, to improve the overall socioeconomic status of the displaced poor and other vulnerable groups, and to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the project to share in project benefits.

Environmental and Social Standard 3 - Indigenous People: This Standard aims to design and implement Projects in a way that fosters respect for Indigenous Peoples (IP) identity, dignity, human rights, economy and culture, as defined by the Indigenous Peoples themselves, so that they: (a) receive culturally appropriate social and economic benefits, (b) do not suffer adverse impacts as results of projects, and (c) can participate actively in projects that affect them.

2.4 Entitlement matrix in respect of project affected persons of all categories due to implementation of project

In accordance with the R&R measures suggested for the proposed project, all affected households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets and scope of the impacts including socio-economic vulnerability of the affected persons and measures to support livelihood restoration if livelihood impacts are envisaged.

Eligibility Criteria

The affected persons falling in any of the following categories will be eligible for compensation and resettlement assistance in accordance with the principles of this RPF:

- Those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country)
- Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets; provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan; and,
- The Non-titled Lease Occupier, who is being occupying the structures, built by them in the land of others with some financial or non-financial agreement with the landlord, which was not documented legally.
- Those who have no recognizable legal right or claim to the public land, other than the Non-Titled Lease Occupier, they are occupying (*squatters and encroachers occupying the RoW or government land*).
- The Project Affected Persons (PAFs) who were missed in the baseline survey but found genuine during verification survey carried out by MRVC and is confirmed/approved by Grievance Redress Committee (GRC) are also considered as being eligible.
- In case of those houses where land ownership is not transferred, (such as houses occupied on builder's lands where ownership continues to be with builders) the land records must be updated to reflect the actual ownership, before the land acquisition is completed. The RTFCTLARRA Act requires that land records must be updated prior to announcement of award.

Specifically,

- All legitimate occupants of land and building affected will be eligible for the benefit of R & R Policy.
- For title holders, the date of notification through Form No. 3 of intended acquisition under Direct Purchase method will be treated as the cut-off date and for non-titleholders will be the date of completion of census and socio-economic

survey.

- However, PAFs who are squatters and not the legitimate occupants of land or buildings shall be eligible for R&R only if enumerated during the baseline
- Any new unauthorized structures or additions to existing structures carried out after the cut-off date and their occupants will not be eligible for R & R. Similarly, the occupants of a structure except legal heir who have acquired the structures after the cut-off date shall not be eligible for the benefits of Resettlement and Rehabilitation. However, members added to the eligible households by way of birth and marriage after the cut-off date will be considered eligible for R&R.
- The PAFs who ever missed in the baseline survey but found genuine during verification survey carried out by MRVC and is confirmed/approved by GRC are also considered as being eligible.

Resettlement assistance measures

- a) The project has adopted the unit costs for R&R assistance as available in LARR Act, 2013, which came into effect from 1st January 2014, and presented in **Table 2.3**. These unit rates are now updated as increment of 5% per annum from January 2015 and calculated as (5% x 7 years =) 35% increment to January 2021, of the basic rate mentioned in the respective Act and approved by AIIB. (Ref. Para 11 of Part 2 of the RFCTLARR (Maharashtra) Act 2013)

Table 2-3: Unit Rates revised of January 2021

Sr. No	Entitlement	Unit rates as of January 2015 (in INR)	Revised as of January 2021 (rounded off to nearest INR)
1	Livelihood assistance (Lump sum or Annuity or 50% as onetime payment and 50% in Annuity)	5,00,000	6,75,000
2	Livelihood assistance - Annuity	2,000/per month	2,700/per month
3	One-time assistance for loss of Cattle shed/petty shop	25,000	33,750
4	One-time assistance for displaced artisan/small traders	50,000	67,500
5	Transportation/ Shifting assistance for displaced	50,000	67,500
6	Subsistence allowance for displaced @ INR 3000 per month for 1 year	36,000	48,600 (INR 3,600 per month for one year)

Sr. No	Entitlement	Unit rates as of January 2015 (in INR)	Revised as of January 2021 (rounded off to nearest INR)
7	One-time Resettlement Allowance for shifting of house	50,000	67,500
8	Additional Vulnerable Assistance for displaced vulnerable families	50,000	67,500

Entitlement Matrix

- a) In accordance with the principles of this resettlement policy framework, all possible affected, displaced households and persons losing livelihood will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets and scope of the impacts including socio-economic vulnerability of the displaced persons and measures to support livelihood restoration if livelihood impacts are envisaged.
- b) An Entitlement Matrix, presented in **Table 2.4**, has been developed, that summarizes the types of losses and the corresponding nature and scope of entitlements; and follows National, State laws and AIB Policy, and the RFCTLARR (Maharashtra) Act 2013 and R&R Policy of MUTP-III, 2018.

Table 2-4: Entitlement Matrix

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
1		<p>Titleholder (Land Owners as recorded in revenue records, or Land occupiers with claims/ rights recognized under State/ Central laws, including who is entitled to granted Patta, rights on the land under any laws of the State including assigned Land)</p> <p><u>Through Direct Purchase Method</u></p>	
1.1	Loss of Land	<p>Direct purchase of Land with negotiation through district level committee headed by the district collector, and comprising officials of the revenue, irrigation, public works, legal, town planning and land acquisition departments.</p> <ul style="list-style-type: none"> • The base rate of land will be determined by highest value among <ul style="list-style-type: none"> i. Ready reckoner value fixed under the Maharashtra Stamp Act (59 of 1958) and the Maharashtra Stamp (Determination of True Market Value of Property) Rules, 1995. (Ref. Para 1 of Part 1 of the RFCTLARR (Maharashtra) Act 2013). ii. Average Sale price of similar types of land situated in the nearest vicinity area, ascertained from the highest 50% of the sale deeds of the preceding 3 years iii. Consented amounts paid for PPPs or private companies • The multiplication factor by which market value of the land is multiplied will be from 1.00 (One) to 2.00 (two) based on the distance of the project from urban area, as may be notified by the appropriate Government. (Ref. Clause 2 of Schedule I of the RFCTLARR 2013). The multiplier factor will vary for each place and will be defined by the Assistant Director of Town Planning of the respective area, as per the current practice of the Govt. of Maharashtra. • Solatium will be 100% on the base rate after multiplied with multiplication factor 	<p>Govt. Decision No. SANKIRNA- 03/2015/Para. Kra. 34/A-2 dated 30thSept. 2015 of Revenue & Forest Department, Govt. of Maharashtra.</p> <p>If B is the base rate/ consented rate of land, M is the applicable Multiplication factor, A is the affected area and 25% being the incentive on giving up of land through direct purchase, then the compensation L will be, $L = 1.25 \times (2 \times B \times M \times A)$</p> <p>Note: In case of Class-II Land or conditional-ownership Land, necessary amount equivalent to 10% of market value as per Government</p>

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
		<ul style="list-style-type: none"> • The land owner will also get an incentive of 25% in addition and on the compensation amount calculated as above • The land owner will have a maximum of three months' time to give consent from the date of application of direct purchase from the Government Agency. On lapse of the three months' time, the land will be acquired under compulsory acquisition under the RFCTLARR 2013 Act. 	Resolution No. Adivasi-3109/1180/Pra. Kra.106/L-9 dated 15.07.2010 (Serial no. Tribal-3109/1180/No. 106/L-9 Date 15 July 2016 Code No. 201007161423) of Revenue & Forest Department, Government of Maharashtra, will be deducted from the total compensation payable to Land owner and said amount will be transfer to Government of Maharashtra.
1.2	Loss of Structure and other immovable assets	a. <ul style="list-style-type: none"> • Replacement cost of building/ structures or part of building/ structure affected, calculated at the Cash compensation at latest Schedule of Rates of PWD/ ready reckoner rate for similar kind of structure, without depreciation. • The compensation for any other immovable assets attached to the land and/ or buildings will be determined by a competent engineer or any other specialist in the relevant field, as may be considered necessary by the Collector • The Solatium will be 100% on the replacement cost of building/ structure and other immovable assets 	

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
		<ul style="list-style-type: none"> • The structure compensation value defined above will also attract 12% increment per annum from the cut-off date till the award of the land value to the land owner. 	
		b. <ul style="list-style-type: none"> • Right to salvage materials in favor of the structure owner of the affected building/ structure, if the incumbent demolishes the affected part of the building/ structure by own self 	
1.3	Loss of Standing Trees/ crops etc. in affected land	<ul style="list-style-type: none"> • Cash compensation for crops, fruits, flowers or product and by-products from the affected trees/ crops etc., if any, will be calculated by <ol style="list-style-type: none"> i. Concerned Forest Department or similar authority for Timber trees ii. Concerned State Agriculture Extension Department or similar authority for standing crops iii. Concerned Horticulture Department or similar authority for horticulture and/ or perennial trees • The Solatium will be 100% on the cash compensation calculated above. 	U/s 29(2) and 29(3) of RFCTLARR Act 2013
1.4	Loss of Livelihood	If the Affected Structure is commercial structure: <ul style="list-style-type: none"> • A lump-sum compensation equivalent to one year's income, determined by the proper documents, viz., IT return, or as determined by the respective authority. • Or, in lieu of nonavailability proper documentation of income, Rs. 30,000 per affected family of livelihood looser, as livelihood assistance. 	First bullet as per MUTP R&R Policy. Second Bullet, as per Sl. 7 of Second Schedule of RFCTLARR 2013

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
2		<p>Titleholder (Land Owners as recorded in revenue records, or Land occupiers with claims/ rights recognized under State/ Central laws, including who is entitled to granted Patta¹ rights on the land under any laws of the State including assigned Land)</p> <p>Through RFCTLARR Act 2013, in lapse of the Direct Purchase method</p>	
2.1	Loss of Land	<p>a. Land Acquisition, in lapse of or in lieu of Direct Purchase Method or Acquisition of land on payment of compensation as per RFCTLARR (Maharashtra) Act 2013 and RFCTLARR Act 2013</p> <ul style="list-style-type: none"> • The base rate of land will be determined by highest value among <ul style="list-style-type: none"> i. Ready reckoner value fixed under the Maharashtra Stamp Act (59 of 1958) and the Maharashtra Stamp (Determination of True Market Value of Property) Rules, 1995. (Ref. Para 1 of Part 1 of the RFCTLARR (Maharashtra) Act 2013). ii. Average Sale price of similar types of land situated in the nearest vicinity area, ascertained from the highest 50% of the sale deeds of the preceding 3 years iii. Consented amounts paid for PPPs or private companies • The multiplication factor by which market value of the land is multiplied will be from 1.00 (One) to 2.00 (two) based on the distance of the project from urban area, as may be notified by the appropriate Government. (Ref. Clause 2 of Schedule I of the RFCTLARR 2013). The particular 	<p>If B is the base rate of land, M is the Multiplication factor & A is the affected area, then the compensation L will be,</p> $L = 2 \times (B \times M \times A).$ <p>If the Award of the compensation is after Y years from the cut-off date, then L will be incremented at 12% per annum to Ly,</p> $Ly = L + (0.12 \times Y \times L)$ <p>Note: In case of Class-II Land or conditional-ownership Land, necessary amount equivalent to 10% of market</p>

¹Patta is land revenue record which establishes the title/ownership of land. The Patta Register is maintained at Taluka office and contains ownership details of all Land holdings.

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks				
		<p>multiplier factor will vary for each place and will be defined by the Assistant Director of Town Planning of the respective area, as per the current practice of the Govt. of Maharashtra and MUTP projects.</p> <ul style="list-style-type: none"> • Solatium will be 100% on the base rate after multiplied with multiplication factor • The land value defined above will also attract 12% increment per annum from the cut-off date till the award of the land value to the land owner (Ref. 30(3) of the RFCTLARR Act 2013) 	<p>value as per Government Resolution No. Adivasi-3109/1180/Pra.Kra.106/L-9 dated 15.07.2010 (Serial no. Tribal-3109/1180/No. 106/L-9 Date 15 July 2016 Code No. 20100716142313001) of Revenue & Forest Department, Government of Maharashtra, will be deducted from the total compensation payable to Land owner and said amount will be transfer to Government of Maharashtra.</p>				
		<p>b. If, the land plot is partially acquired and the land owner desires that the whole plot be acquired on the grounds that the plot has been rendered uneconomic, then</p> <ul style="list-style-type: none"> • Either, One-time additional assistance of the Base Compensation amount (base amount is without any Solatium, multiplication factor and interest), to the balance land of the affected plot, owner based on the following percentage of the left-over land in the land plot acquired from each partially affected plot. Whereas, the ownership of the residual land shall continue to remain with the land owner. <table border="0" style="width: 100%; margin-left: 40px;"> <tr> <td style="text-align: center;"><u>Area Acquired (% of total plot)</u></td> <td style="text-align: center;"><u>Additional Assistance Ratio (R)</u></td> </tr> <tr> <td style="text-align: center;">Up to 50%</td> <td style="text-align: center;">Nil</td> </tr> </table>	<u>Area Acquired (% of total plot)</u>	<u>Additional Assistance Ratio (R)</u>	Up to 50%	Nil	<p>If B is the base rate of land, R is the Additional assistance ratio (0, or 0.15 or 0.25) of left-over land & A is the Balance area of the plot, then the Additional Assistance will be, $AA = (B \times R \times A)$ In case of acquisition of total area of land plots, this subsection (c) will not apply.</p>
<u>Area Acquired (% of total plot)</u>	<u>Additional Assistance Ratio (R)</u>						
Up to 50%	Nil						

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)		Remarks
			<p style="text-align: center;">More than 50% to 75% 15%</p> <p style="text-align: center;">More than 75% 25%</p> <p>In case of severance of land plot (division into two parts or more parts due to acquisition); the left-over plots on either side shall be treated independently as per the above.</p> <ul style="list-style-type: none"> • Or, if the left-over land plot is non-feasible or non-economic or unusable or if the land owner desires that the whole land to be acquired, the MRVC/ competent authority may acquire the total land. 	
2.2	Loss of Building/ Structure	a.	<ul style="list-style-type: none"> • Replacement cost of building/ structures or part of building/ structure affected, calculated at the Cash compensation at latest Schedule of Rates of PWD/ ready reckoner rate for similar kind of structure, without depreciation. • The Solatium will be 100% on the replacement cost of building/ structure • The structure compensation value defined above will also attract 12% increment per annum from the cut-off date till the award of the land value to the land owner. 	
		b.	<p><u>If, the building/ structure is partially acquired</u></p> <ul style="list-style-type: none"> • Either, Entitlement of additional amount of 25% on the compensation calculated as (a) above to be paid on the compensation award for the affected part of structure to enable repair the damage, where the owner/ occupier would have, in their own interest, decide to retain the remaining part of the affected structure, provided that continuous use of such structure is possible without hazards. • Or, Full compensation of structure payable in case of partial impact making unimpaired or safe use of structure is difficult 	In case of only a partly affected structures, and If the remaining structure is non-feasible or unusable or its owner desires that the whole structure to be acquired, the competent authority can award compensation for the total

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)		Remarks
				structure also.
		c.	Right to salvage materials in favour of the structure owner of the affected building/ structure, if the incumbent demolishes the affected part of the building/ structure by own self	
2.3	Loss of Standing trees/Crops etc. in affected land		<ul style="list-style-type: none"> • Three months' advance notice to affected parties to harvest crops, fruits, flowers or product and by-products from the affected trees/ crops etc. • <u>Or, in lieu of 3 months' advance notice</u>, Cash compensation as estimated u/s 29(3) of RFCTLARR Act 2013 & calculated by: <ol style="list-style-type: none"> i. Concerned Forest Department or similar authority for Timber trees ii. Concerned State Agriculture Extension Department or similar authority for standing crops iii. Concerned Horticulture Department or similar authority for horticulture and/ or perennial trees 	
2.4	Other affected immovable assets		The compensation for any other immovable assets attached to the land and/ or buildings will be determined as provided u/s29oftheRFCTLARR2013	First Schedule of RFCTLRR Act. 2013
2.5	Loss of Cattle Shed		Any affected family losing cattle sheds are entitled for at least Rs. 30,000/- or, any amount specified as the appropriate Government, towards reconstruction of the Cattle Shed	Second Schedule of RFCTLRR Act. 2013 & Para 11 of Part 2 of the Govt. of Maharashtra Notification no. No. LQN.

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
			12/2013/C.R. 190/A-2 dated 27 th August 2014 under RFCTLARR (Maharashtra) Act2013
2.6	Loss of Petty Shop	Any affected family losing petty shops are also entitled for at least Rs. 30,000/- or, any amount specified as the appropriate Government, towards reconstruction of the Petty Shop	-do-
2.7	Resettlement Assistance	One-time Resettlement Assistance of Rs. 60,000/- for each affected family	-do-
2.8	Income Assistance	<p>Employment opportunity, where jobs are created through project, after providing the suitable training and skill development in the required field, at a rate not lower than the minimum wages provided in any laws for the time being in force, to at least one member of the affected family in the project or arrange for a job in such other project, as may be required</p> <p><u>Or,</u></p> <ul style="list-style-type: none"> • One-time payment of Rs. 6,00,000 per affected family • Or, Annuity policies that shall pay not less than Rs. 2,400 per month per family for 20 years, with appropriate indexation to the Consumer Price Index for Agricultural Laborers 	<p>-do-</p> <p>Any one choice of options of among (a), or (b) of Income Assistance have to be opted from the affected family</p> <p>The Annuity options are entitled of increment at the inflation rates, as have indexation to the Consumer Price Index</p>
2.9	Grant for Artisan, Small Traders, self-employed person and	If the project affected persons falls under the categories of Artisan, Small Traders, Self-employed persons or any other similar categories, One-time financial assistance of amount, as notified by the appropriate Government but not less than Rs. 60,000/-	-do-

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
	certain others		
2.10	Subsistence Grant for Displaced Families	Subsistence allowance of Rs. 3,600/- per month for one year, or, Rs. 43,200/- one-time, for each displaced family, require to relocate due to the project	-do-
2.11	Transportation Allowance for Displaced Families	One-time financial assistance of Rs. 60,000/- as transportation cost for shifting of the family, building materials, belongings and cattle, if any	-do-
3	Non-title Lease Occupier (NTLO)	The Non-title Lease Occupier are Family/ Household, who are occupying the affected structure with some financial or non-financial lease arrangements with the land owner, but the land ownership arrangements are not documented properly or legally)	
	<p>The Non-title Lease Occupier will be treated as Structure Owners/ Occupiers, if they possess documentary evidence of Building Tax, Trade License or any other documents as may be accepted by the District Collector, on the land which belongs to the legal Land Owner.</p> <p><u>In case of acquisition of land in Direct Purchase method</u>, the land compensation calculated as Sl. 1.1 of the Entitlement Matrix, will be provided to the Legal Owner of Land and the other compensations calculated as Sl. 1.2 to 1.4 of the Entitlement Matrix will be provided to the Non-titled Legal Occupier.</p> <p><u>In case of acquisition of land through LA Act</u>, the land compensation calculated as Sl. 2.1 of the Entitlement Matrix, will be provided to the Legal Owner of Land and the other compensations calculated as Sl. 2.2 to 2.11 will be provided to the Non-titled Legal Occupier.</p>		

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
4	Squatter		
4.1	Loss of Structure	<ul style="list-style-type: none"> In Rural Areas, provision of a constructed house of 300 sq ft area or as per the specifications of the Pradhan Mantri Awas Yojana (Gramin) or similar scheme of State/ Central Governments, or Cash assistance at the ready reckoner rate or as determined by the Government of Maharashtra, but cash assistance shall not less than Rs.1,65,000/- In Urban Areas, provision of a constructed house of 269 sq ft, or Cash assistance at the ready reckoner rate or as determined by the Government of Maharashtra, but cash assistance shall not less than Rs.5,50,000/- 	R&R Policy for MUTP-III vide GR: MRD-3317/Pra.Ka.15/Navi/7 dated 20th August 2018 of Urban Development Department, Govt. of Maharashtra
4.2	Loss of Commercial Structure	Any affected family losing Commercial Structures are entitled for at least Rs. 30,000/- or, any amount specified as the appropriate Government	Second Schedule of RFCTLRR Act. 2013 & Para 11 of Part 2 of the Govt. of Maharashtra Notification no. No. LQN. 12/2013/C.R. 190/A-2 dated 27 th August 2014 under RFCTLARR (Maharashtra) Act 2013
4.3	Subsistence Grant for Displaced Families	Subsistence allowance of Rs. 3,600/- per month for one year, or, Rs. 43,200/- one-time, for each displaced family, require to relocate due to the project	- Do -
4.4	Transportation Allowance for Displaced	One-time financial assistance of Rs. 60,000/- as transportation cost for shifting of the family, building materials, belongings and cattle, if any	- Do -

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
	Families		
4.5	Grant for Artisan, Small Traders, Self-employed person and certain others	If the project affected livelihood losers falls under the categories of Artisan, Small Traders, Self-employed persons or any other similar categories, One-time financial assistance of amount, as notified by the appropriate Government but not less than Rs. 60,000/-	- Do -
5	Livelihood losers	<ul style="list-style-type: none"> • Tenants of Residential/ Commercial affected Structures • Workers/ Employees of Commercial affected structure 	
5.1	Rental Allowance (Tenants)	<ul style="list-style-type: none"> • Each Residential Tenants are entitled for Rental Allowances for six months for a monthly rent of Rs. 5,000/- per month in rural areas or of Rs. 7,000/- per month in urban areas <u>Or,</u> • Each Commercial Tenants are entitled for Rental Allowances for six months for a monthly rent of Rs. 7,000/- per month in rural areas or of Rs. 10,000/- per month in urban areas 	
5.2	Income Assistance (Workers/ Employees)	<ul style="list-style-type: none"> • A lump-sum compensation equivalent to one year's income, determined by the proper documents, viz., IT return, or as determined by the respective authority. • Or, in lieu of availability proper documentation of income, Rs. 30,000 per affected family of livelihood loser, as livelihood assistance. 	First bullet as per MUTP R&R Policy. Second Bullet, as per Sl. 7 of Second Schedule of RFCTLARR 2013

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
5.3	Grant for Artisan, Small Traders, Self-employed person and certain others	If the project affected livelihood losers falls under the categories of Artisan, Small Traders, Self-employed persons or any other similar categories, One-time financial assistance of amount, as notified by the appropriate Government but not less than Rs. 60,000/-	Second Schedule of RFCTLRR Act. 2013 & Para 11 of Part 2 of the RFCTLRR (Maharashtra) Act2013
6	Kiosk/ Shacks/ Easily removable structure operators		
6.1	Kiosk	The Kiosks/ Shacks/ easily removable structure operators are only entitled for Rs. 30,000 as conceptually mentioned for re-construction of petty structure	
7	Special Compensation on Vulnerability, Multiple Displacement, Advance Notice and Livelihood Training <ul style="list-style-type: none"> • Titleholders (For Acquisition under LARR Act) • Non-Titled Lease Operators (For Acquisition under LARR Act) • Encroachers/Squatters • Kiosk/ Shacks/ Easily removable structure operators • Tenants of Residential/ Commercial affected Structures • Workers/ Employees of Commercial affected structure 		
7.1	Special Assistance for Vulnerable Categories	If the affected families fall under the vulnerable affected families of i) Scheduled Caste, ii) Scheduled Tribe, iii) Physically challenged Head of Households, iv) Families under Below Poverty Line (BPL), v) Women Headed Households and vi) Old persons living alone (all members of the family having age of more than 60 years) All Vulnerable affected families will receive a one-time vulnerable assistance of Rs. 60,000/-	Second Schedule of RFCTLRR Act. 2013 & Para 11 of Part 2 of the RFCTLRR (Maharashtra) Act2013

Sr. No	Type of Loss	Entitlement (Compensation and R&R Assistance)	Remarks
7.2	Special Compensation of multiple displacement	<p><u>If the affected family faced displacement or resettlement from any other project or this project previously,</u> Any family which has already been displaced by appropriate Government for the purpose of acquisition under the provision of <u>RFCTLARR Act 2013 and if so,</u> displaced, is entitled for additional compensation equivalent to that of the compensation determined under <u>RFCTLARR Act 2013</u> for second or successive displacement. (Clause no. 39 of <u>RFCTLARR Act 2013</u>).</p>	
7.3	Skill Development Training	<p>One adult member of all the affected family, whose livelihood is affected, will be entitled for skill training. The skill development training may be provided from any competent training institute under the aegis of the National Skill Development Corporation in their scheduled training modules, or any other Institute/ individual as the Appropriate Government may also decide on the training institutes or training modules, provided the cost of training should be at least Rs. 25,000/- per family</p>	<p>The Training assistance amount will be provided to the training institutes after completion of successful training of the affected person and not to the affected family.</p>
7.4	Advance Notice	<p>All the affected families, irrespective of the categories of eligibility and entitlements, will have to give at least three months' advance notice of the loss and shifting</p>	
8	Any unforeseen Impacts		
8.1	Any other unforeseen impacts	<p>Any other unforeseen impacts, if any, may be incorporated and the Entitlement Matrix will be updated by the MRVC on the occurrence and verification of the unforeseen impact</p>	

Summary of Eligibility

The summary of the eligibility specified in the Entitlement Matrix as per the categories of Titleholder, Encroacher, Non-titled Lease Occupier, Squatter, Tenants and Livelihood Losers are presented in **Table 2.5** below.

Table 2-5: Summary of Eligibility of Entitlement as per Entitlement Matrix

Sr. no.	Category of Affected Family	Eligibility of Entitlement
1	Titleholder	<p><u>Direct Purchase Method</u></p> <ul style="list-style-type: none"> • Compensation at 25% extra of the compensation of loss calculated under sections 26 to 30 of the RFCTLARR Act 2013 through private negotiations with the Land Owner. • Loss of Livelihood for loss of any commercial structure <p><u>Acquisition under LA Act in lapse of Direct Purchase Method</u></p> <ul style="list-style-type: none"> • Compensation for Loss of Land • Compensation for Loss of Structure without depreciation • Compensation for Loss of Trees/crops • Compensation for Loss of other Removable Assets • Resettlement Assistance • Income Assistance • Occupational Grant for Artisan, Petty Shop keepers etc. • Skill Development Training Provisions • Subsistence Allowance for displaced families • Transportation Allowance for displaced families • Vulnerability Allowance for vulnerable families • Additional compensation for multiple displaced families
2	Non-Titled Lease Occupier	Same as the title holder, as specified above, but the compensation of land is provided to the legal Land Owner and other compensations provided to the Non-titled Lease occupier in either the cases through Direct Purchase or acquisition through LA Act.

Sr. no.	Category of Affected Family	Eligibility of Entitlement
3	Affected Families, who were provided with Govt. Land in previous resettlement ²	<p>The families will be treated as owner of the land and <u>Direct Purchase Method</u></p> <ul style="list-style-type: none"> • Compensation at 25% extra of the compensation of loss calculated under sections 26 to 30 of the RFCTLARR Act 2013 through private negotiations with the Land Owner. • Loss of Livelihood for loss of any commercial structure <p><u>Acquisition under LA Act in lapse of Direct Purchase Method</u></p> <ul style="list-style-type: none"> • Compensation for Loss of Land • Compensation for Loss of Structure without depreciation • Compensation for Loss of Trees/crops • Compensation for Loss of other Removable Assets • Resettlement Assistance • Income Assistance • Occupational Grant for Artisan, Petty Shop keepers etc. • Skill Development Training Provisions • Subsistence Allowance for displaced families • Transportation Allowance for displaced families • Vulnerability Allowance for vulnerable families • Additional compensation for multiple displaced families, equivalent to the amount of total compensation calculated as above
4	Squatter	<ul style="list-style-type: none"> • Compensation for Loss of Structure without depreciation • Loss of Commercial Structure • Subsistence Allowance for displaced families • Transportation Allowance for displaced families • Vulnerability Allowance for vulnerable families • Occupational Grant for Artisan, Petty Shop keepers etc.
5	Tenant	<ul style="list-style-type: none"> • Rental Allowances • Occupational Grant for Artisan, Petty Shop keepers etc. • Skill Development Training Provisions

²In case of Class-II Land or conditional-ownership Land, necessary amount as per prevailing rules of Government of Maharashtra will be deducted from the total compensation payable to Landowner and said amount will be transferred to Government of Maharashtra.

Sr. no.	Category of Affected Family	Eligibility of Entitlement
6	Wage Earners / Livelihood Losers	<ul style="list-style-type: none"> • Income Assistance • Skill Development Training Provisions • Occupational Grant for Artisan, Petty Shop keepers etc. • Vulnerability Allowance for vulnerable families
7	Kiosk	<ul style="list-style-type: none"> • Skill Development Training Provisions • Entitled for Transport Allowances
8	Wheeler/ Daily Structures	<ul style="list-style-type: none"> • No Eligibility of Entitlement

- a) There shall be no income tax deductions in line with Sec. 96 of the RFCTLARR Act. In the event any deductions are made toward taxes, such amounts will have reimbursed.
- b) Even after payment of compensation, PAFs would be allowed to take away the materials salvaged from their dismantled houses and shops and no charges will be levied upon them for the same. A notice to that effect will be issued intimating that PAFs can take away the materials so salvaged within 15 days of their demolition; otherwise, the same will be disposed by the project authority without giving any further notice. Trees standing on the land owned by the government will be disposed of through open auction by the concerned Revenue Department/ Forest Department.
- c) Updating Units of Entitlement: All units of entitlement and assistances will be revised by MRVC, based on Consumer Price Index for Urban Non-manual Employees and communicated to all District Administration/LA Facilitation Agency for making payment as per the revised rates. The updating will be done annually in the month of March and will become effective from the 1st day of April of that year.
- d) The Mumbai Metropolitan Regional Development Authority (MMRDA) will rehabilitate the Squatters and Encroachers in Government Land (Para 5 of Govt. Resolution MRD-3318/C.R. 06 (part 2)/UD-7 dated 5th Dec 2018 of Urban Development Department, Govt. of Maharashtra)
- e) The MMRDA with assistance of MRVC will verify each of the Affected Squatter and Encroachers PAFs with their personal identification, family details, status of livelihood, the extent of project affection, eligibility on the project onset but before the demolition of structures.

2.4.1 GOOD INTERNATIONAL INDUSTRY PRACTICES (GIIP)

The International Finance Corporation (IFC) Environmental Health and Safety (EHS) Guidelines represent the generally accepted state of the art in sustainability performance in private sector and multilateral project finance. They represent the requirements of World Bank Group “Safeguards” policies that have been to some degree adopted worldwide by multilateral, bilateral, and private financial institutions. Effluent Discharge Standards, Ambient Air Quality Standards and Noise standards published by IFC are given in **Annexure 2.2, 2.4 and 2.5** respectively.

2.5 Administrative Framework

The Ministry of Environment Forest and Climate Change (MoEFCC) is the nodal agency in the administrative structure of the central government for planning, promotions, co-ordination and overseeing the implementation of India’s environmental and forestry policies and programs. The major responsibilities of MoEFCC include:

- Environmental resource conservation and protection, including environmental impact assessment, clearance of developmental projects.
- Co-ordination with the other ministries and agencies, voluntary organizations and professional bodies for environmental action plans.
- Promotion of research and development, manpower planning and training and creation of environmental awareness.
- Liaison and coordination with international agencies involved in environmental matters.

2.5.1 CENTRAL AND STATE POLLUTION CONTROL BOARDS

The Central Pollution Control Board is responsible for pollution control throughout the country. In addition to the control of air, noise and water pollution it is also responsible to ensure effective control of disposal of hazardous wastes and storage and handling of hazardous chemicals and substances. With the enactment of air and water pollution laws, states have set-up their own State Pollution Control Boards (SPCBs) to monitor industrial emissions and effluents and to approve the operation of new industries after scrutiny. The functions of the SPCBs include:

- The planning of comprehensive state programs for the prevention and control of air and water pollution and to ensure the implementation thereof.
- Inspection of pollution control equipment/ plants for monitoring of their efficiency.

The SPCB in consultation with the Central Pollution Control Board may establish norms for air quality, gaseous emission, and noise level etc.

2.6 Conclusion

The ESIA of the project shall be prepared in line with above policies and legislations requirements of Government of India, Government of Maharashtra & AIIB's ESF. In case of more than one standard/guideline for any activities/ parameter, more stringent one shall be adopted.

CHAPTER 3. PROJECT DESCRIPTION

3.1 Background

Mumbai's suburban railway network is the busiest commuter train system with 8.2 million passengers using the trains to commute daily. Annually, the suburban railways transport 2.95 billion passengers, which is about a third of the world's population. The system consisting of 427.5 km of network with about 3000 trains daily experience epic proportions of overcrowding. Due to extensive reach of Mumbai Suburban Railway across the Mumbai Metropolitan Region, and its intensive use by the local suburban population, the Mumbai Suburban Railway suffers from excessive overcrowding. Over 7,000 passengers are packed in a 12-car rake during peak hours as against the rated carrying capacity of 3,600.

The capacity enhancement work under MUTP I & II have resulted in increase in Railway corridors and conversion of all nine car rakes into 12 car rakes. Further, augmentation of services and increase of length of trains to 15 coaches is underway. These additional services have increased commuter volume at the station and therefore station capacities are required to be upgraded. MUTP III is in progress and will lead to similar capacity enhancements. There is urgent need for additional circulating space by provision of elevated decks, interconnection between Foot Over Bridges (FOBs) and improving entry/exit points.

There are a total 119 stations on Mumbai Suburban Railway System. Most of the stations are more than 80 years old and are highly congested. MRVC has planned to upgrade the suburban stations from passenger's amenities point of view.

The objective of the station improvement plan of MRVC is to provide a development with holistic planning, which allows substantial increase of station's quality of service, in terms of comfort, facilities and pedestrian fluidity including following:

- Fast and efficient passenger flow: To deal with the level of traffic, existing difficulties in managing passengers' movement and dispersal
- Safety and Security: To mend the decrepit structures and provide fire safety, in the station area.
- Maximum Passenger Convenience: To make stations equipped in terms of services, commercial facilities, amenities and waiting premises.
- Flexible Interiors: To take care of the fast construction, it is important to adapt the flexible/ modular interiors, so that in short span of time, facilities can be provided.
- It is planned to upgrade work consisting of provision of FoB's, elevated decks, inter connection between deck/FoB's, skywalk, relocation of service buildings, stalls, kiosks etc., improving entry/exit, improve circulating area, provision of green space, improvement in general lighting and general electrical services etc. at various stations of Central & Western Railways.

3.2 Stations Proposed for Improvement

Station Improvement has been proposed by MRVC on 17 stations. Out of the 17 stations, six are on the Central line, four are on Harbour line of Central Railway and remaining seven are on western line of Western Railway. The list of proposed 17 stations for improvement is shown in **Table 3-1**. During tender stage it was communicated by MRVC that out of the below 17 stations, land acquisition is required only in 04 stations namely Mumbai Central local, Kandivali, Mira Road and Nalla Sopara. Later, MRVC improved the GAD drawings and communicated that private land acquisition will not take place in these stations. The existing railway and government land will be utilized for station improvement project.

Table 3-1: Proposed 17 Stations for Improvement

S. No.	Railway Network	Line	Station
1.	Central Railway	Central Line	Bhandup
2.			Mulund
3.			Ghatkopar
4.			Dombivli
5.			Neral
6.			Kasara
7.		Harbour Line	GTB Nagar
8.			Chembur
9.			Govandi
10.			Mankhurd
11.	Western Railway	Western Line	Mumbai Central (Local)
12.			Santacruz
13.			Kandivali
14.			Mira Road
15.			Bhayandar
16.			Vasai Road
17.			NallaSopara

3.3 Proposed Improvement

In line with the objectives of the station development, detailed study has been done by MRVC. The detailed study of each station and the improvement measures has been proposed with respect to following parameters:

- Station Sizing
- Platform
- Concourse
- Staircase width
- Escalators/Lifts
- Facilities for the persons with disability

- Passengers amenities
- Ticketing
- Entry Point of Stations
- Waiting area etc.

These improvement measures at the identified stations have resulted in land acquisition. RITES on behalf of MRVC are undertaking ESIA study to assess the impact of this development on environment and society. Station wise development plans are detailed in forgoing paragraphs.

3.3.1 STATION WISE DEVELOPMENT PLANS

Earlier ESIA study was based on the conceptual plans being provided by MRVC, findings were derived from the survey which was conducted on ground. However, to minimize the environmental and social impacts subsequently latest revisions were done in final GADs which were provided by the project proponent to conduct the ESIA survey in the AoI. After final GADs except, it was found that AoI for social impact is very less and will have a very less scope for R&R.

To evaluate the potential social impact, census and socio-economic survey was conducted based on the conceptual plan provided by MRVC. The findings of survey revealed that 343 structures and 434 project affected families were likely to be affected which included both title-holders and non-titleholders.

In order to minimize the impact on structures and families, the changes were made in design. The affected structures and families were reduced after changes in design. RITES team carried out social survey based on the final design provided by MRVC on 15th September, 2021. MRVC's project engineers along with RITES team verified the affected structures during joint site visit.

Station wise development plans are discussed as under.

Mumbai Central Station

Overview

Mumbai Central is a major railway station on the Western lines, situated in Mumbai, in an area known by the same name. Designed by British architect Claude Batley, it serves as a major stop for both local and inter-city/express trains with separate platforms for them. It is also a terminal for several long-distance trains including Mumbai Rajdhani Express. Trains depart from the station connecting various destinations mostly across states in the northern, eastern, and north-eastern parts of India.

The Bombay Baroda Central India Rail organization has extended its reach from Baroda to Pathankot via Delhi. The Colaba-Ballard Pier Railway Station proved insufficient in meeting the demands of a growing population which led the government to make plans for the construction of Bombay Central. The present suburban route that once ran till Colaba was earlier served by Bellasis Road station. It was renamed Bombay central (local) after the construction of the long-distance Bombay Central Terminus (BCT) on the eastern side.

General arrangement

There are in total four platforms in the suburban station, all are aisle platforms. These platforms can be accessed from five locations. two are from western side i.e. entry 4 & 5 both lead to the F.O.B. from Sane Guruji Marg. Entry-1 is from Bellas is road South. Entry-6 is from the Eastern Side across the station road which directly links Long Distance Platforms and Sub-urban platforms. Entry-2 is from the concourse of Long-Distance station connected to the F.O.B through a ramp. All F.O.B.s are connected to each other at one stretch which becomes a bottle neck during peak hours because the width of the F.O.B. is not optimum.

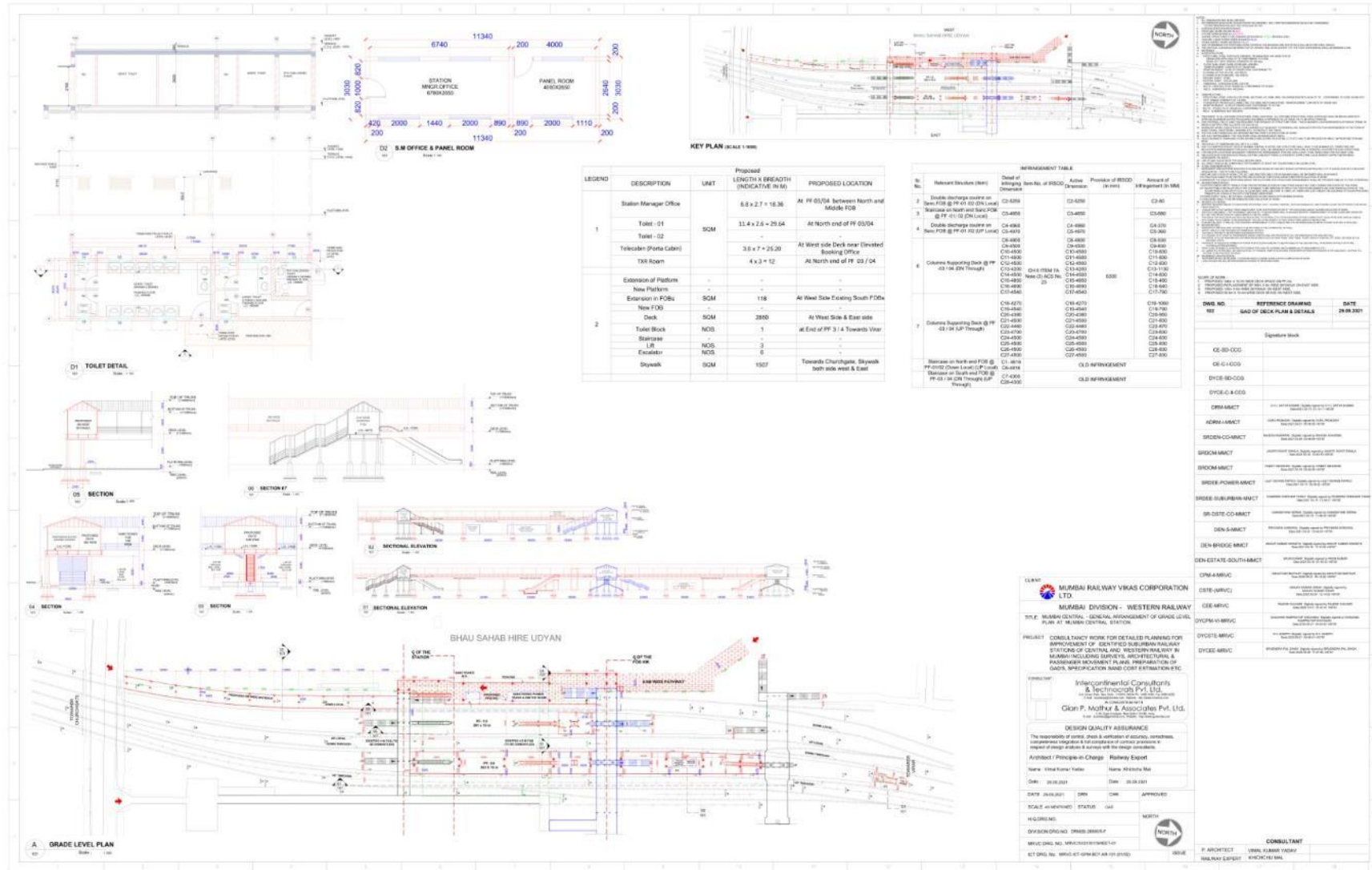
Proposal for development

The proposed development is shown in **Figure 3.1**.

Environmental and Social Impacts

Due to the proposed station improvement project, Mumbai Central station will have minimum environmental and social impacts. This station will require 0.16 ha of government land (BMC). MRVC officials and RITES team carried out a Joint Site Verification to identify the affected structures as per the revised design. It was observed that only four structures which were used as residential unit will likely to be affected consisting of 13 PAPs. The residential units are developed on government land.

Figure 3.1 Proposed Development at Mumbai Central Station



KANDIVALI STATION

Overview

Kandivali is the 21st station on Western Suburban line when starts from Churchgate. All slow trains and some of the through/fast trains are stopping at this station. The station is having 4 nos. platforms. Platform No.1 is Home Platform, PF No.2 & 3 is Island PF and PF No.4 is single side discharge. The location of station is surrounded by mainly residential area. The south FOBs are connected by skywalk in the BMC area on east side. The major portion of commuters is coming from south-east side due to major residential locality on this side.

General arrangement

There are total four platforms at Kandivali. There are two elevated booking offices, both are on south side of Station on east and west side. One Booking Office is in the middle of the station on the ground floor on the west side of the station. There are total four FOB's which are located at north, south and middle portion connecting respective elevated booking offices. The south side FOBs are having east-west connectivity. Middle FOB is also having connectivity from east to west. The north FOB is having connectivity to PF and west side only as on east side there is no movement of commuters due to the presence of Kandivali Car-shed.

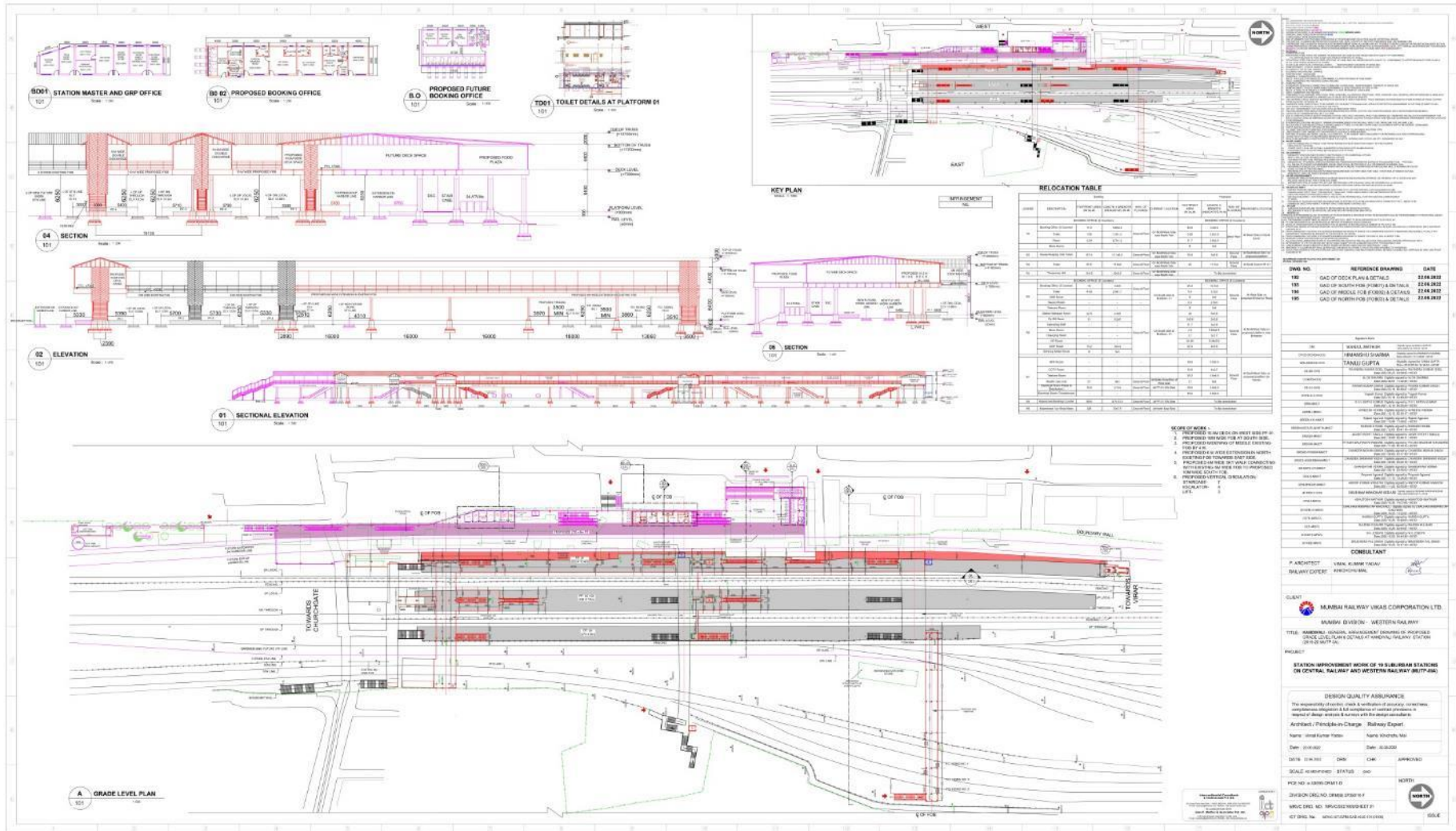
Proposal for development

The proposed development is shown in **Figure 3.2**.

Environmental and Social Impacts

0.51 ha of existing railway land will be required for Kandivali station. No private land will be required for the project. During joint site verification, it was observed that there would be no social impact or involuntary resettlement due to the proposed development. However, 22 trees will likely be affected by the development.

Figure 3.2 Proposed Development at Kandivali Station



MIRA ROAD STATION

Overview

Mira Road is the 23rd station on western line when starts from Churchgate. It is a slow train station. The station has four platforms. One out of which is home platform on the western side and the others are aisle platforms. The station is in a commercial area and mostly there are restaurant and eateries around. The station is accessible from eastern side only since there is no settlement on the western side.

General arrangement

There are in total four platforms. The platform at the eastern side is home platform. Platform two & three are aisle platform. Platform at the western end is not accessible from the western side since there is no approach route available, neither vehicular nor pedestrian. Ticket offices are available at the North end and South end at the F.O.B. level. There are in total three F.O.Bs to cross the tracks. All of the F.O.B.s are connected through a sky walk outside the station. This is further connected to a skywalk leading to Shrikant Dhawde and Naya Nagar road intersection.

Proposal for development

The proposed development is shown in **Figure 3.3**.

Environmental and Social Impacts

Due to the proposed station improvement project, Mira Road station will only have environmental impacts. About seven trees are likely to get affected. No structures and families are affected in this station. No private land will be required for Mira Road station. Currently on west side the land is being used as Salt Lake. The existing 0.24 ha railway land will be utilized for proposed development which includes construction of entrance plaza & widening of platform.

BHAYANDAR STATION

Overview

Bhayandar is a railway station on the Western line of the Mumbai Suburban Railway network. It serves the Bhayandar suburban area and is regulated by Mira Bhayandar Municipal Corporation (MBMC).

General arrangement

There are in total eight platforms. One at the eastern side is home platform and the others are aisle platforms. There are in total four F.O.B.s the F.O.B in south is BMC F.O.B. having no direct access to the platforms. It is connected to the adjacent railway F.O.B. over the home platform. There are two ticket offices on the Eastern Side. The F.O.B. in the middle is the widest of all. The F.O.B. in the north, is connected to a sky walk in West, that goes up to Balaji Nagar. There is one small ticket office outside the station on western side.

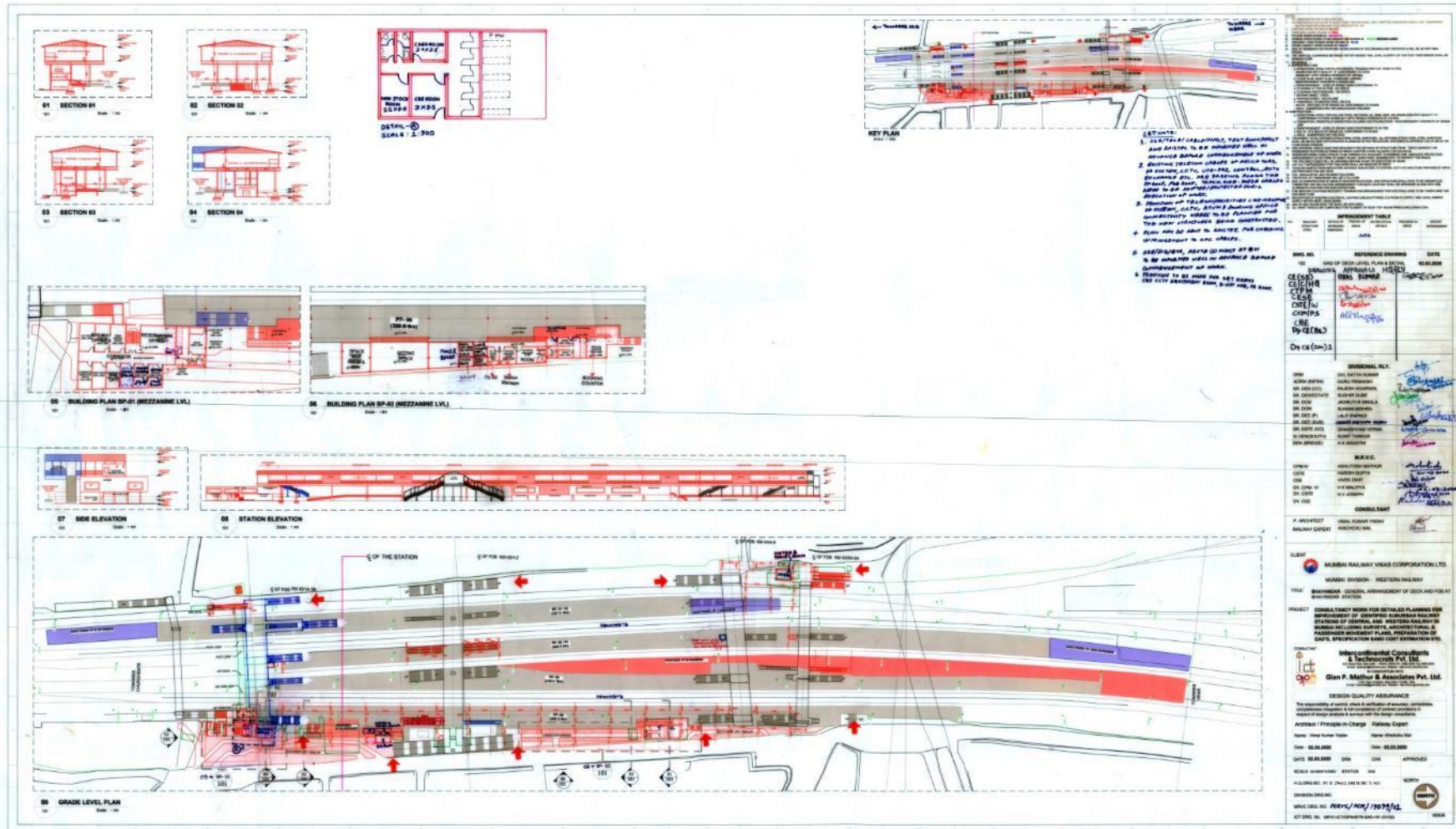
Proposal for development

The proposed development is shown in **Figure 3.4**.

Environmental and Social Impacts

The existing government land will be utilised for station improvement. The proposed development at Bhayandar station will not involve private land acquisition and involuntary resettlement. However, one tree will likely be affected.

Figure 3.4 Proposed Development at Bhayandar Station



VASAI ROAD STATION

Overview

Vasai Road is the 27th station & having junction arrangements on Western Suburban line when starts from Churchgate. All slow & fast trains are stopping at this station. The station is having seven nos. platforms. Platform No.1 is Home Platform, PF No.2 is having double discharge facility, PF No.2 & 3, PF No.4 & 5 and PF No.6 & 7 are Island PFs. PF No.1 is handling starting/terminating slow locals from Vasai Station, PF No.2 & 3 is handling the slower trains to & from Virar, PF No. 4 & 5 is handling the fast trains to & from Virar and PF No. 6 & 7 is handling the south bound main line trains/DMU Shuttle to & from Diva side. The location of station is surrounded by mainly residential area. The station is handling a lot of main line express trains as well as good trains due to junction of Mumbai Central – Delhi Rajdhani Route and Vasai- Diva Route of Central Railway. The station has very high passengers' footfalls. The area of Vasai is controlled Vasai Virar Municipal Corporation.

General arrangement

There are total seven platforms at Vasai Road. There are three booking offices, one elevated on west side, one at ground floor on the west side and 3rd one is ground floor on the north east side. There are total two FOB's which are located at north, and middle portion connecting respective elevated booking offices. Both the FOBs are having east & west connectivity.

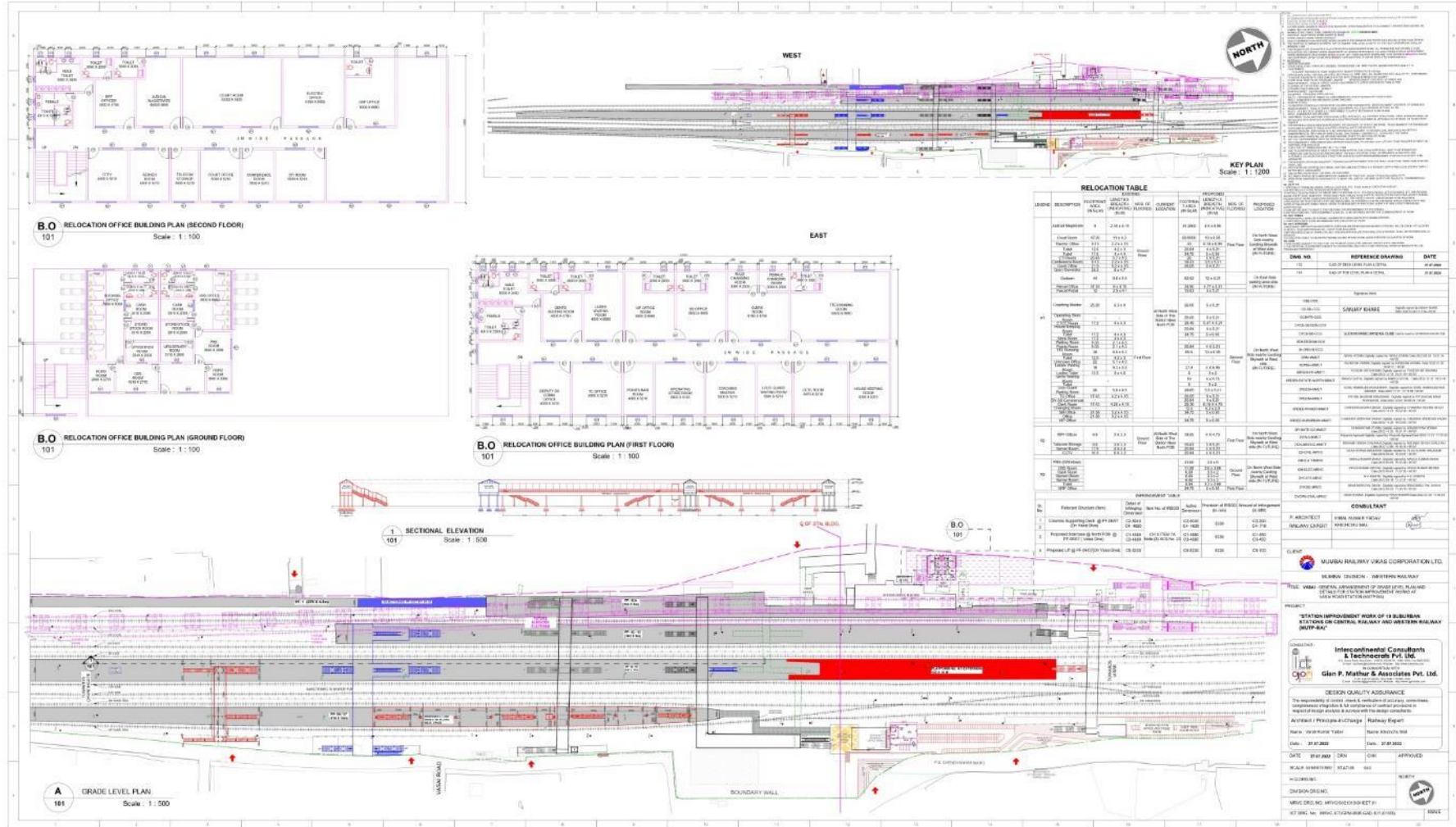
Proposal for development

The proposed development is shown in **Figure 3.5**.

Environmental and Social Impacts

No environmental and social impact is reported at Vasai Road station.

Figure 3.5 Proposed Development at Vasai Road Station



NALLA SOPARA STATION

Overview

Nalla Sopara is the 28th station on Western Suburban line when starts from Churchgate. All slow & fast local trains are stopping at this station. The station is having 4 nos. platforms. Platform No.1 & 4 is home Platform, PF No.2 & 3 are Island PFs. The location of station is surrounded by mainly residential area of lower middle class especially on the east side. The station has very high passengers' footfalls and in the past, the growth of passenger has been increased substantially. The area of Nalla Sopara is controlled by Vasai Virar Municipal Corporation.

General arrangement

There are total 4 platforms at Nalla Sopara. There are 2 booking offices, both are on the ground floor on east as well as on the west side. There are total 3 Nos. of FOB's which are located at north, south and middle portion connecting booking offices as well as having east and west connectivity.

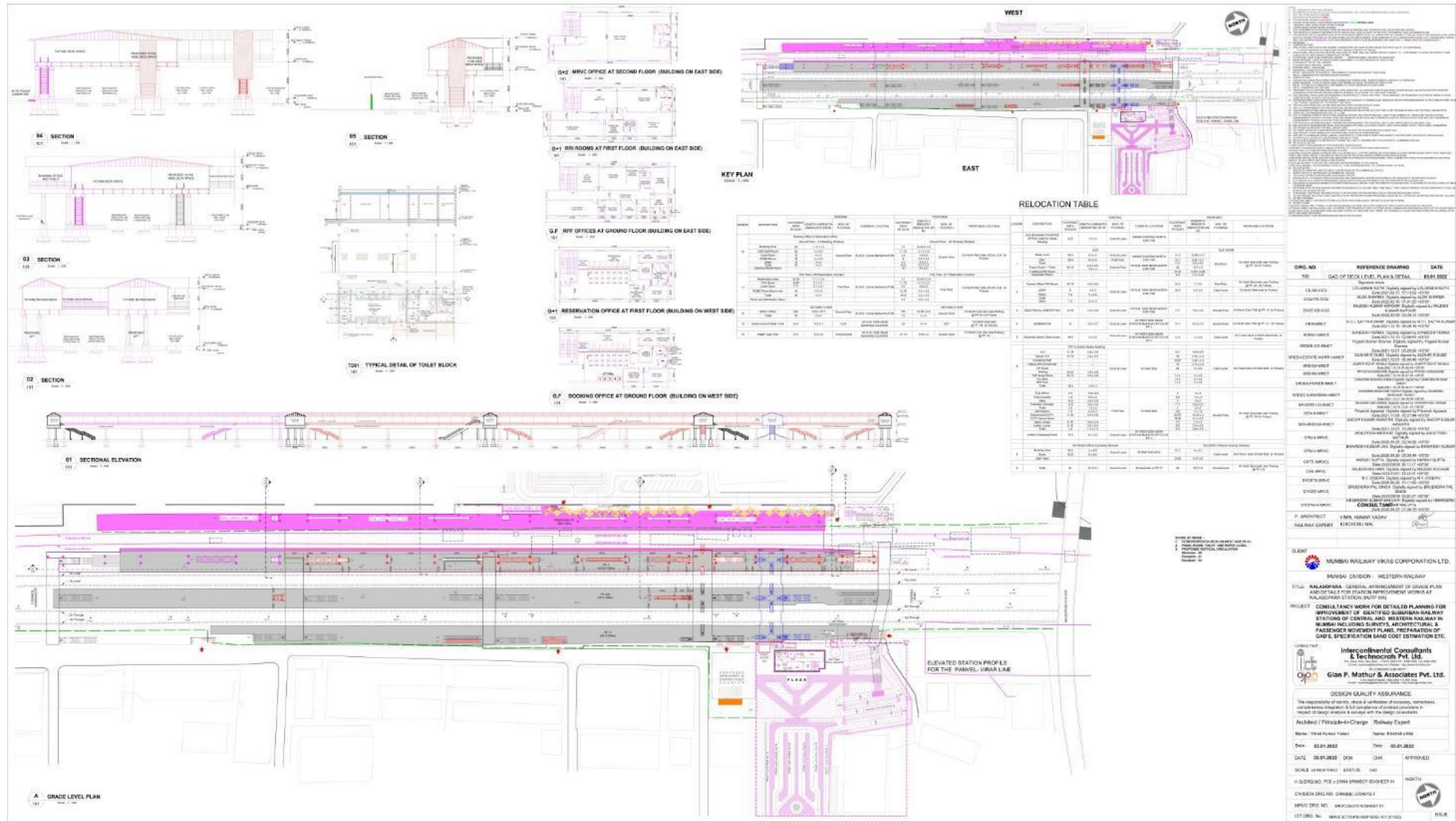
Proposal for development

The proposed development is shown in **Figure 3.6**.

Environmental and Social Impacts

The existing 1.19 ha of government land will be utilised for the proposed improvement, which includes the construction of a platform and deck. The proposed development at Nalla Sopara will not involve private land acquisition, involuntary resettlement, or the loss of trees and structures. The changes were made in design to avoid impact on commercial structures.

Figure 3.6 Proposed Development at Nalla Sopara Station



MULUND STATION

Overview

Mulund station is the 18th station on Central Railways. Mulund area is a suburban in north east of Mumbai the area and station falls under Municipal Corporation of Greater Mumbai (MCGM). Mulund is a stop for slow local trains as well as most fast local trains on the Central line of the Mumbai Suburban Railway network. The station is equipped to accommodate 12-car as well as 15-car (Platform no. 3 & 4) local trains. During the peak hour, there is a fast train halting every few minutes.

The station has a ridership of 255711 persons per day as per Wilbur Smith report (in 2012) and an average peak hour flow of 25615.

General arrangement

Above image shows the general arrangement of the station and its structures Mulund station is one of the important stations as it has a lot of commercial aspect for new development. The station has four platforms, starting from platform no. 1 on the west, to platform no. 4, with passing lines on eastern side. The station has three FOBs, one of them belong to Municipal Corporation for east-west connectivity.

Description of western part of station:

- The major passenger flow is from western side, as vehicular entry is only from western side.
- All the railway rooms and structures are situated on western side.
- As we enter the station complex, we enter directly to booking office which opens to a big hall. Western side also has some green areas inside the station complex.
- There are 3 other entries on western side, two of the entries comes from 2-wheeler parking.

Description of Eastern part of station:

- Eastern side do not have direct entry to platform no.4, as there are passing line between the platforms and entries
- The entries are through Fob-1 and Fob -2,
- Booking office e is situated above the tracks, placed between the two FOBs; to match the levels steps climbs up from FOB-1 to booking office.

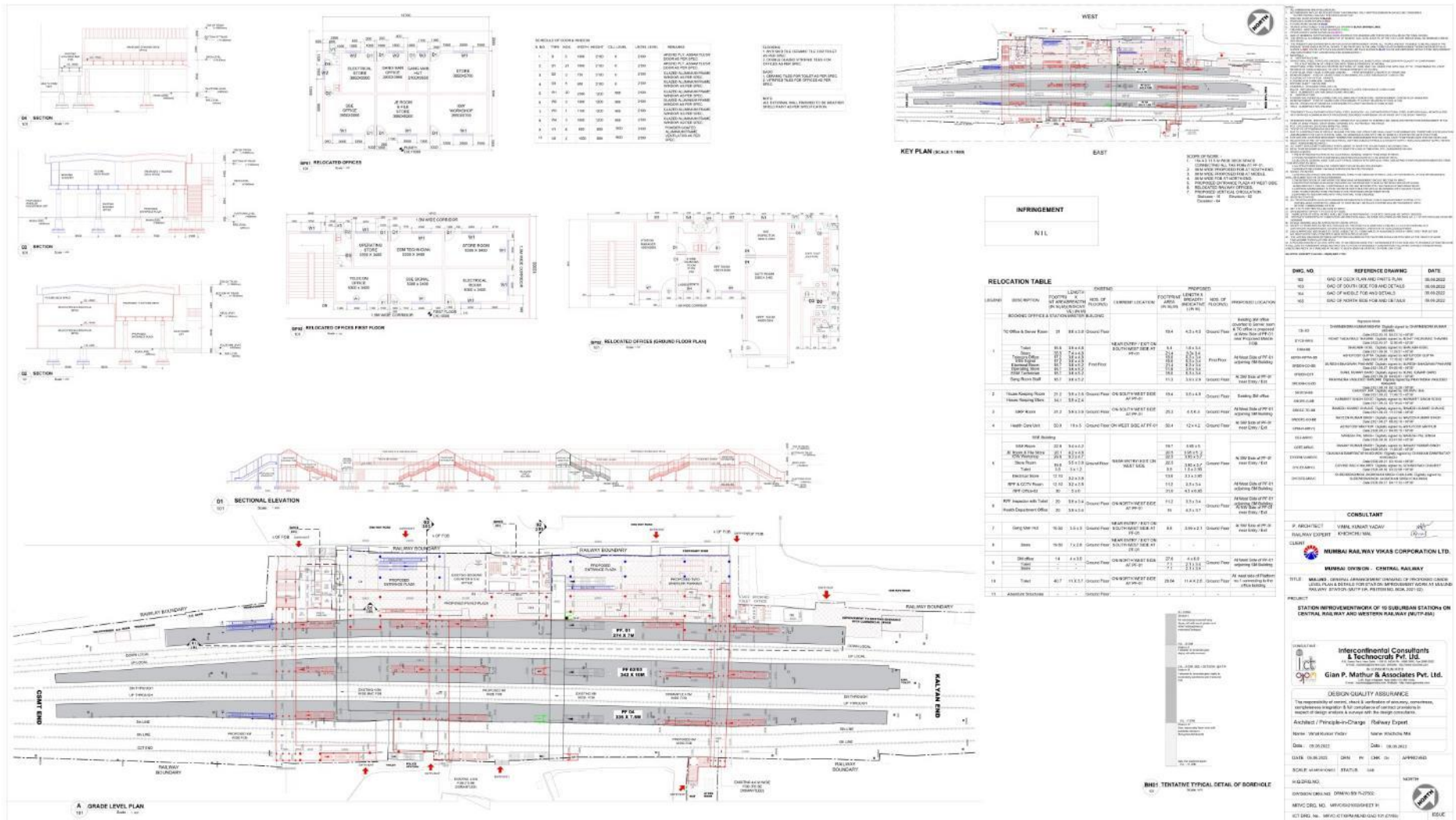
Proposal for development

The proposed development is shown in **Figure 3.7**.

Environmental and Social Impacts

The existing 0.76 ha of government land will be utilised for the proposed improvement. The proposed development at Mulund station will not involve private land acquisition and involuntary resettlement. However, 46 trees will likely to get affected at Mulund station. The changes were made in design to avoid impact on commercial structures.

Figure 3.7 Proposed Development at Mulund Station



DOMBIVLI STATION

Overview

Dombivli Station is the 23rd station starting from Mumbai CST, located on central line, fourth station after Thane. It was built in the year 1887. Currently it has got five platforms and six railway tracks. The Suburban Railway system can be considered as the major arterial communication and transport channel for the residents of Dombivli. It is well connected with Mumbai and has frequent trains in both up and down directions. Both Fast and Slow local trains travelling towards Mumbai CST and towards Karjat or Kasara halt here. Trains originating from Dombivli to Mumbai CST are also available here. It has got connectivity of railway line from Panvel to Dahanu Road.

The station has a ridership of 283362 persons per day as per Wilbur Smith report (in 2012) and a peak hour flow of 20350 in morning and 20150 in the evening. Thus, it has high passenger count compared to rest of the stations.

General arrangement

Above image shows the general arrangement of station and its structures. Station has 6 platforms naming 1, 1A & 2, 3 & 4, and 5. Trains originating from Mumbai CST which terminates at Kalyan halts here (both fast and slow). And trains originating from Thane to Kasara and Karjat halts

Description of western part of station:

- Western side has 3 entry points which open on Platform No. 1
- It has 2 sub-urban booking offices and a railway booking centre.
- All railway offices and station management rooms are on western side.
- In addition to all services and railway structure western side have an open space which is used for parking as shown in image above
- There are two skywalks directly connecting to FOB-1 and FOB-3

Description of Eastern part of station:

- Eastern side has 4 entry points, one of entry is from skywalk connecting FOB-3
- It has 2 booking offices. One of them is at FOB level, can be approached from skywalk
- Land adjacent to entry no-7 is being used as residential area for railway police force

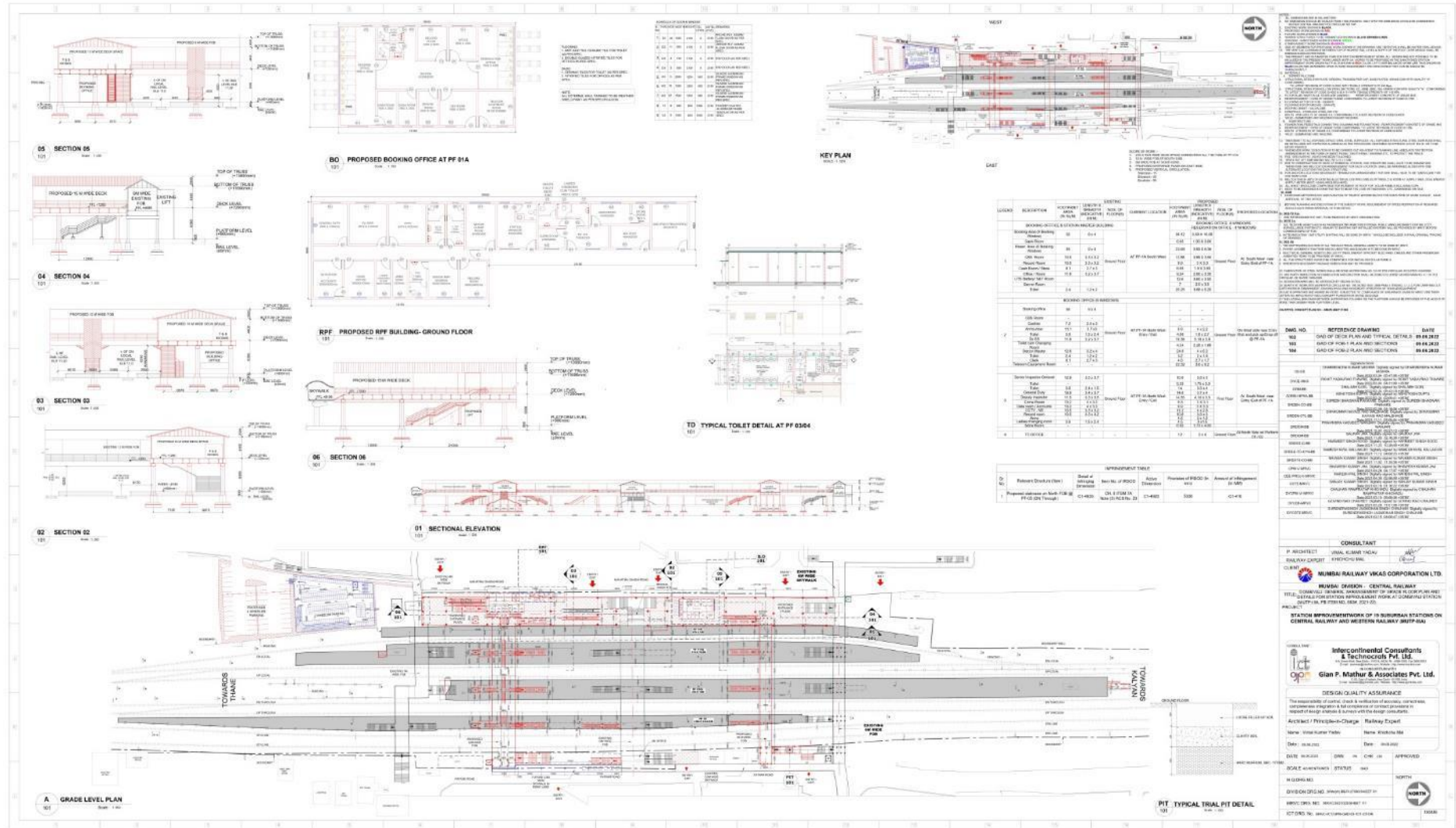
Proposal for development

The proposed development is shown in **Figure 3.8**.

Environmental and Social Impacts

The proposed improvement at Dombivli station will not require land and will not have an involuntary resettlement impact. However, 10 trees will likely be affected by the project. Earlier, 36 kiosk units were operating in the project influence area, which are likely to be affected by the development. A Joint Site Visit was carried out by the MRVC Officials and RITES Team, and it was observed that these units will not be disturbed and can operate as usual during the construction phase.

Figure 3.8 Proposed Development at Dombivli Station



CHEMBUR STATION

Overview

Chembur is a railway station on the Harbour Line of the Mumbai Suburban Railway network. It lies near Chembur Market. It has one train in the morning starting from this station. It has two platforms which serves North and South bound railway line. The Chembur monorail station is connected with a skywalk to the Chembur railway station. The Kurla – Chembur single line was built in 1906 for garbage trains. It was opened to passenger traffic in the year 1924. The Kurla-Mankhurd section which also contained Chembur was electrified in 1950 and suburban steam services were run on one track from 1951. The station provides noise indicators for the blind to help them spot where their compartment comes in. It does not have ramp for the differently mobile. The Station Master's Office has the First Aid Box. The station can be reached by road on both East and West sides.

General arrangement

There are in total two platforms in the station, both are aisle platforms. On Southern side, after taking the drop off one enters through a commercial open area where booking office is there. After that to go to the platform one has to go through F.O.B. at both East and West End. Both the F.O.B.s connect to the skywalk and even to the station road outside the station.

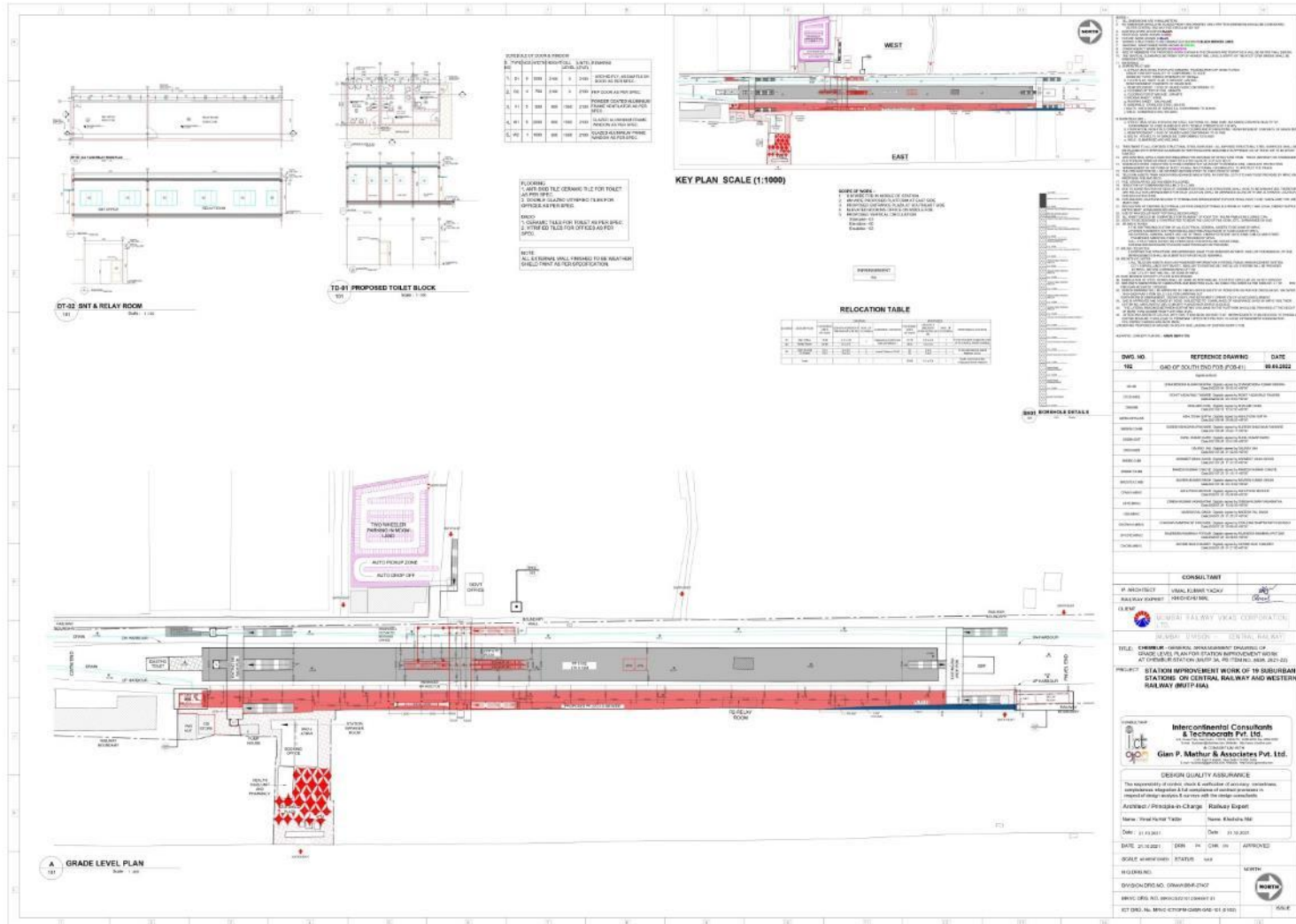
Proposal for development

The proposed development is shown in **Figure 3.9**.

Environmental and Social Impacts

The proposed improvement at Chembur station will have impact on three trees and five structures. All five structures are developed on government land and used as a commercial unit. Out of five units, two are headed by males and three are headed by women. These likely affected units are considered in R&R budget as per RPF.

Figure 3.9 Proposed Development at Chembur Station



GTB NAGAR STATION

Overview

The station was originally called Koliwada railway station. It was renamed Guru Tegh Bahadur Nagar railway station in 1977. GTB Nagar is the 9th station on Harbour line when starts from CSMT. All slow local trains are stopping at this station. The station is having 1 no. Platforms. PF No.2 & 3 are Island PFs.

The location of station is surrounded by mainly residential area. The station has very high passengers' footfalls and in the past, the growth of passenger has been increased substantially.

General arrangement

GTB Nagar has one island platform, one FOB at south side having connectivity to platforms and east-west side. This station has one FOB on north end having connectivity to platforms from east side only.

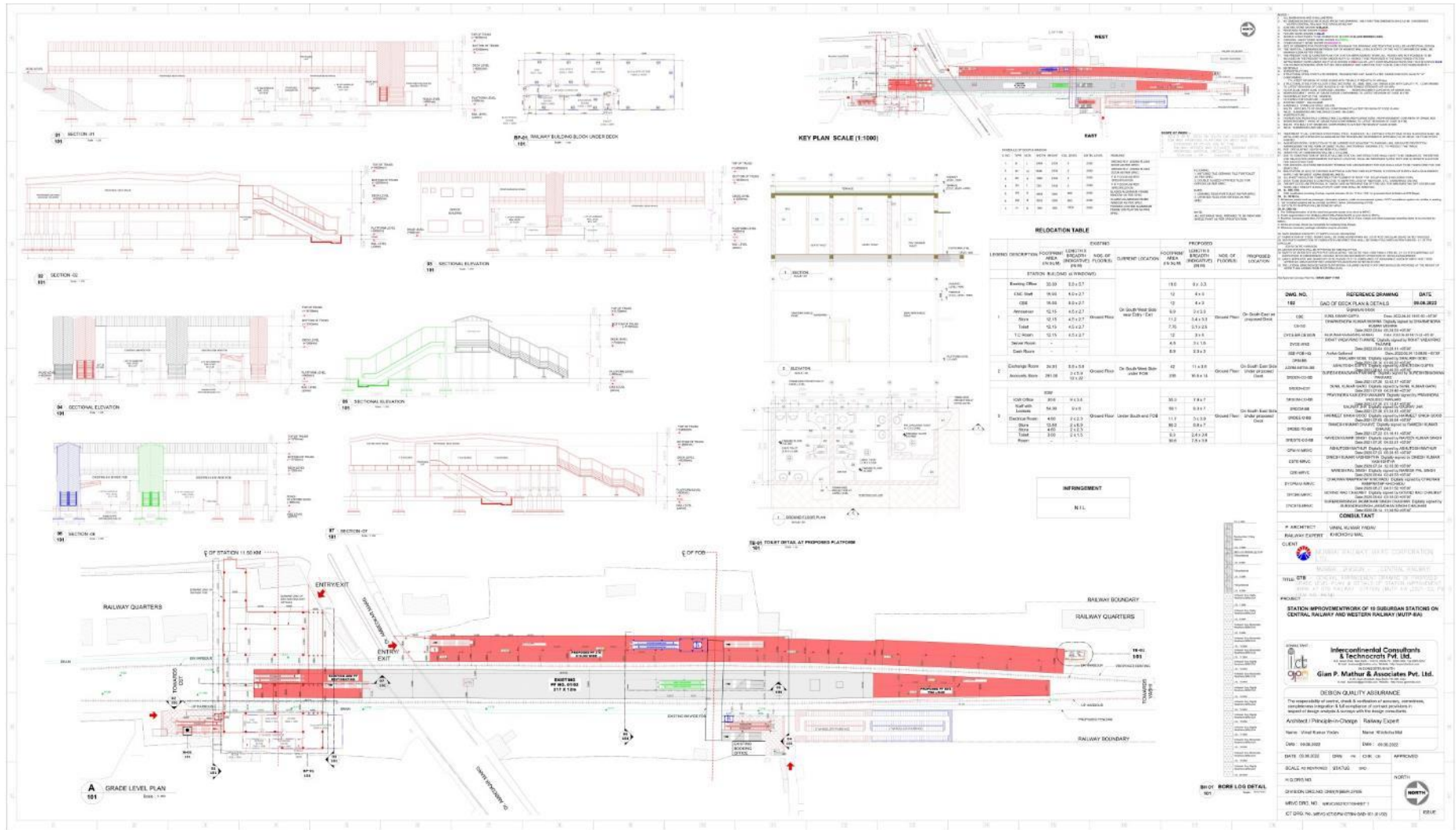
Proposal for development

The proposed development is shown in **Figure 3.10**

Environmental and Social Impacts

There is no scope for land acquisition and loss of residential structures at GTB Nagar station. The environmental impact will involve loss of only five trees.

Figure 3.10 Proposed Development at GTB Nagar Station



BHANDUP STATION

Overview

Bhandup is 16th station on central line when starts from CSMT. All slow local and a few fast trains stop at this station, mostly during the peak hours. The station is having 3 nos. Platforms. PF No. 2 & 3 are Island PFs and platform 1&4 are home platform. The location of station is surrounded by mainly residential area. The station has very high passengers' footfalls and in the past, the growth of passenger has been increased substantially.

General arrangement

Bhandup has total 3 nos. of FOB out of which 2 are located on north side and 1 is on middle/south side. The 1 FOB which on north side has connectivity to all platforms and has east-west connectivity and this also has connection to MCGM skywalk on west side; other north FOB has connection to all platforms from east side only. There 2 booking offices one at east side connected to middle FOB and other on west side near north FOB.

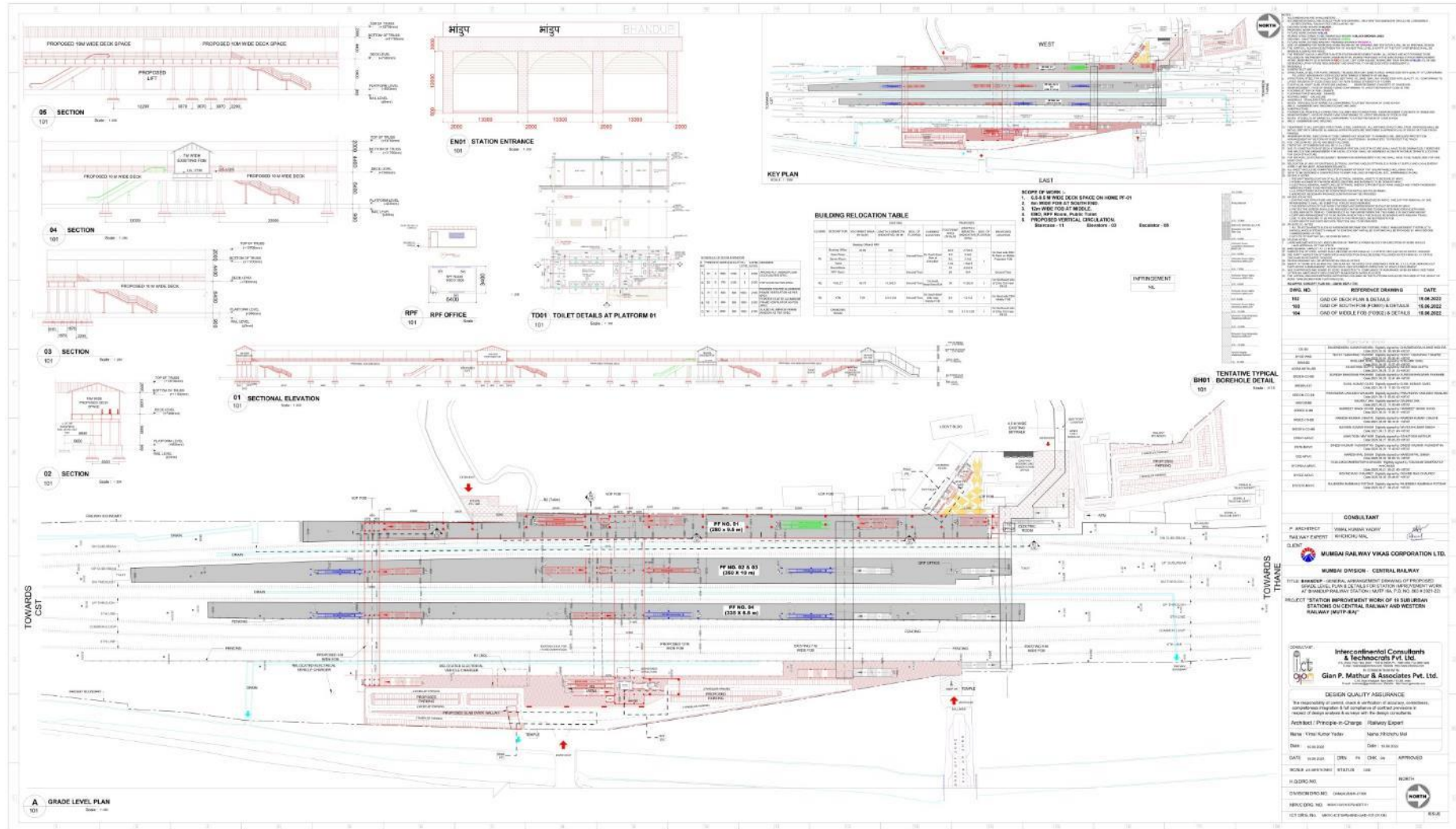
Proposal for development

The proposed development is shown in **Figure 3.11**.

Environmental and Social Impacts

The existing 0.74 ha of government land will be utilised for the proposed improvement. The proposed development at Bhandup station will not involve private land acquisition and involuntary resettlement. However, seven trees will likely to get affected at station. The changes were made in design to avoid social.

Figure 3.11 Proposed Development at Bhandup Station



MANKHURD STATION

Overview

Mankhurd is 15th station on Harbour line when starts from CSMT. All slow local trains are stopping at this station. The station is having 2 nos. Platforms. PF No.1 & 2 are home platform. The location of station is surrounded by mainly residential area. The station is located near eastern express highway. It is the last stop on the line on Salsette Island before leaving for Navi Mumbai on mainland Maharashtra.

General arrangement

Mankhurd has 2 nos. of platforms having total 3 nos. of FOB, one FOB at south end having connection to all platforms. The 2 FOBs' are situated in middle area of platforms; one FOB has connection to platform from north side only. Unlike many of the railway stations in Mumbai, which have 'east' and 'west' sides, this station has a 'north' and 'south' side on either side of the railway track.

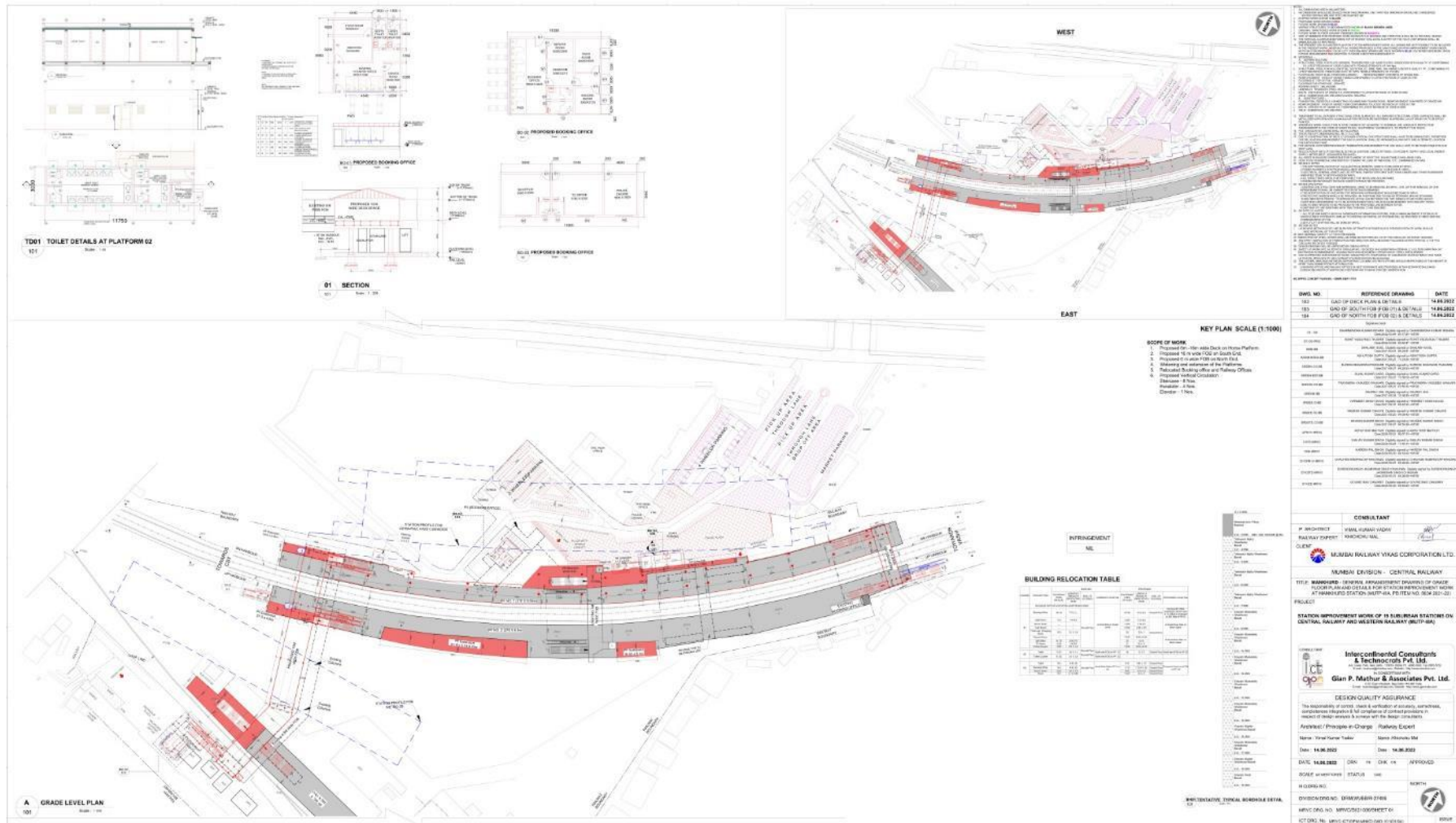
Proposal for development

The proposed development is shown in **Figure 3.12**.

Environmental and Social Impacts

The proposed improvement at Mankhurd station will not involve private land acquisition, involuntary resettlement, loss of tress and structures. The changes were made in the design to avoid environmental and social impacts.

Figure 3.12 Proposed Development at Mankhurd Station



GOVANDI STATION

Overview

Govandi is 14th station on Harbour line of the Mumbai Suburban Railway network when starts from CSMT. All slow local trains are stopping at this station. The station is having 3 nos. Platforms. PF No.1 is home platform and platform no. 2 & 3 is Island 382abellin. The location of station is surrounded by mainly residential area.

General arrangement

The station is having 3 nos. Platforms. PF No.1 is home platform and platform no.2&3 is Island platform. There are total 3 FOBs one at each end of platform i.e north and south end and other is situated at the middle area of platforms. South end FOB and middle FOB has connection to all platforms from east side, where North side FOB has east-west connection.

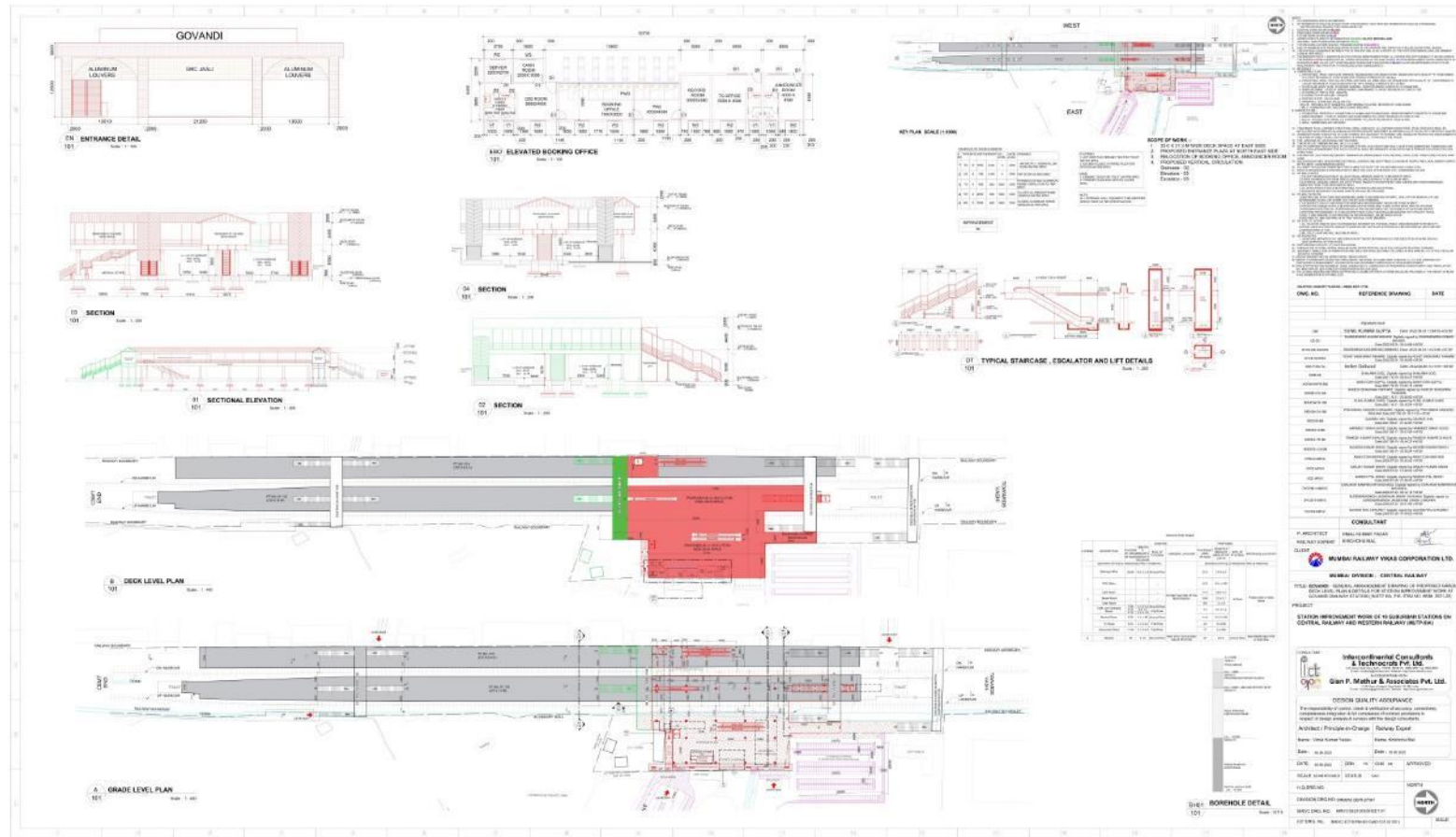
Proposal for development

The proposed development is shown in **Figure 3.13**.

Environmental and Social Impacts

The proposed improvement at Govandi station will not involve land acquisition, involuntary resettlement and loss of structures. However, eight trees will likely be affected by the project.

Figure 3.13 Proposed Development at Govandi Station



NERAL STATION

Overview

Neral is 33rd station on Central line when starts from CSMT. All slow local trains are stopping at this station. The station is having 2 nos. Platforms. PF No.1 & 2 are home platform. Neral is a railway station on the Central line of the Mumbai Suburban Railway network located in the town of Neral. It is a junction railway station between Kalyan – Karjat section of Central railway connecting Mumbai and Pune.

General arrangement

There are total 2 nos. of platforms. There is one middle FOB has connection to platforms.

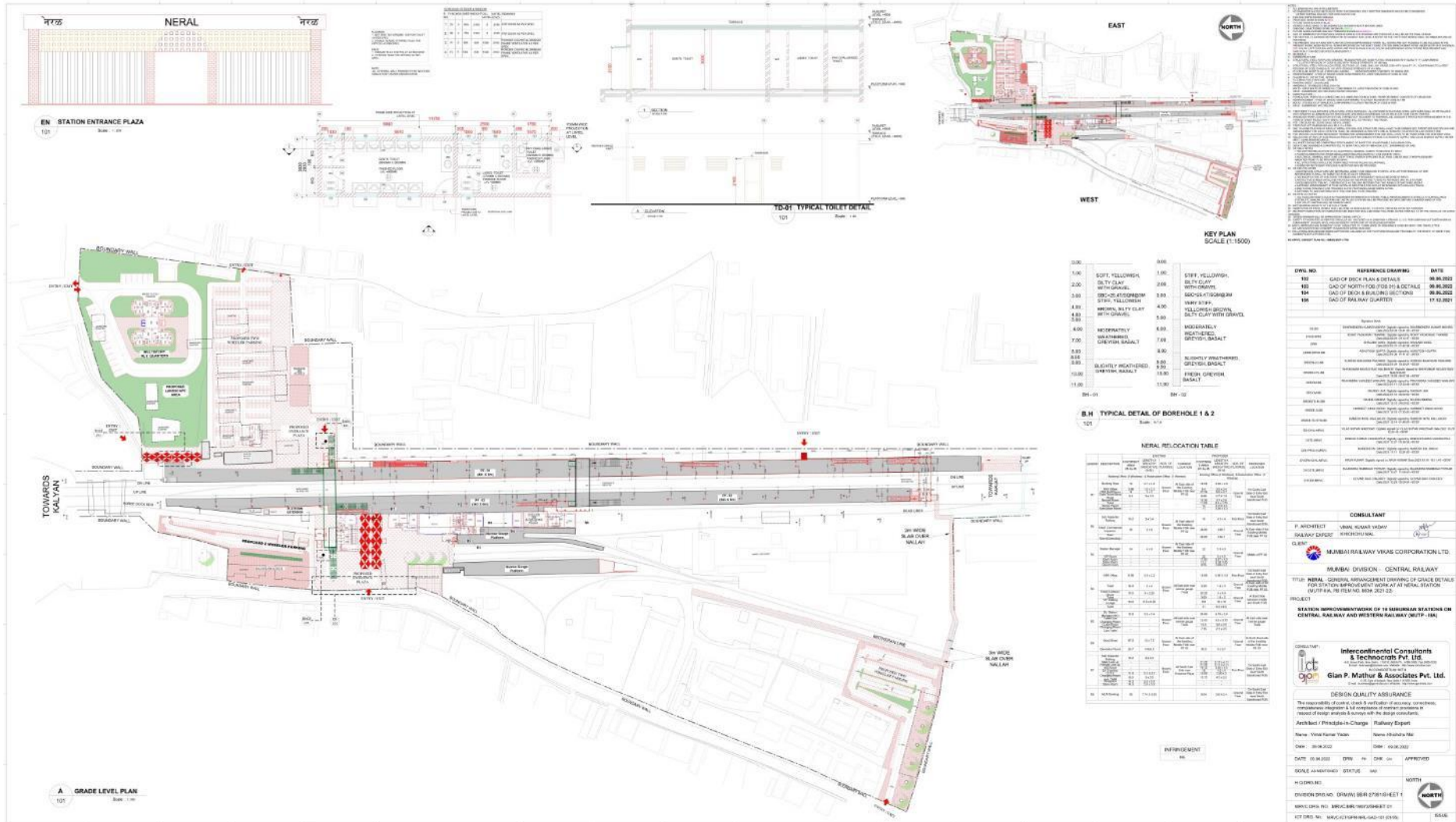
Proposal for development

The proposed development is shown in **Figure 3.14**.

Environmental and Social Impacts

The proposed improvement at Neral station will not involve land acquisition, involuntary resettlement and loss of structures. However, 122 trees will likely be affected by the project.

Figure 3.14 Proposed Development at Neral Station



KASARA STATION

Overview

Kasara is the 35th station on central line from CSTM and is the terminating station for EMU local trains. It is a Kalian-Igatpuri section of Central Railway connecting Mumbai and Nashik. It is the final stop in the north-east sector of the Central Line. For outstation trains, it is a technical halt, where bankers (generally WAG 5 or WAG 7) are attached behind the trains to enable it to cross the tough and high gradient Kasara Ghat. On an average 7 to 8 UP trains have a commercial halt here at platform no.2. All DN local (mail/express) halts (technical halt) here (PF no.1) for connecting the banker which requires to negotiate the ghat section. Platform no.4 is predominantly used for suburban local (EMU) trains starting and ending. MSRTC BUS and Shared taxis to Nasik Road, Jawhar, Mokhada, Rajur and Akole are also available from the station.

General arrangement

Kasara station has total 4 nos. of platform and one FOB at middle. All the platforms are island platform. The FOB has connection to all the platforms and has east – west connection to commuters.

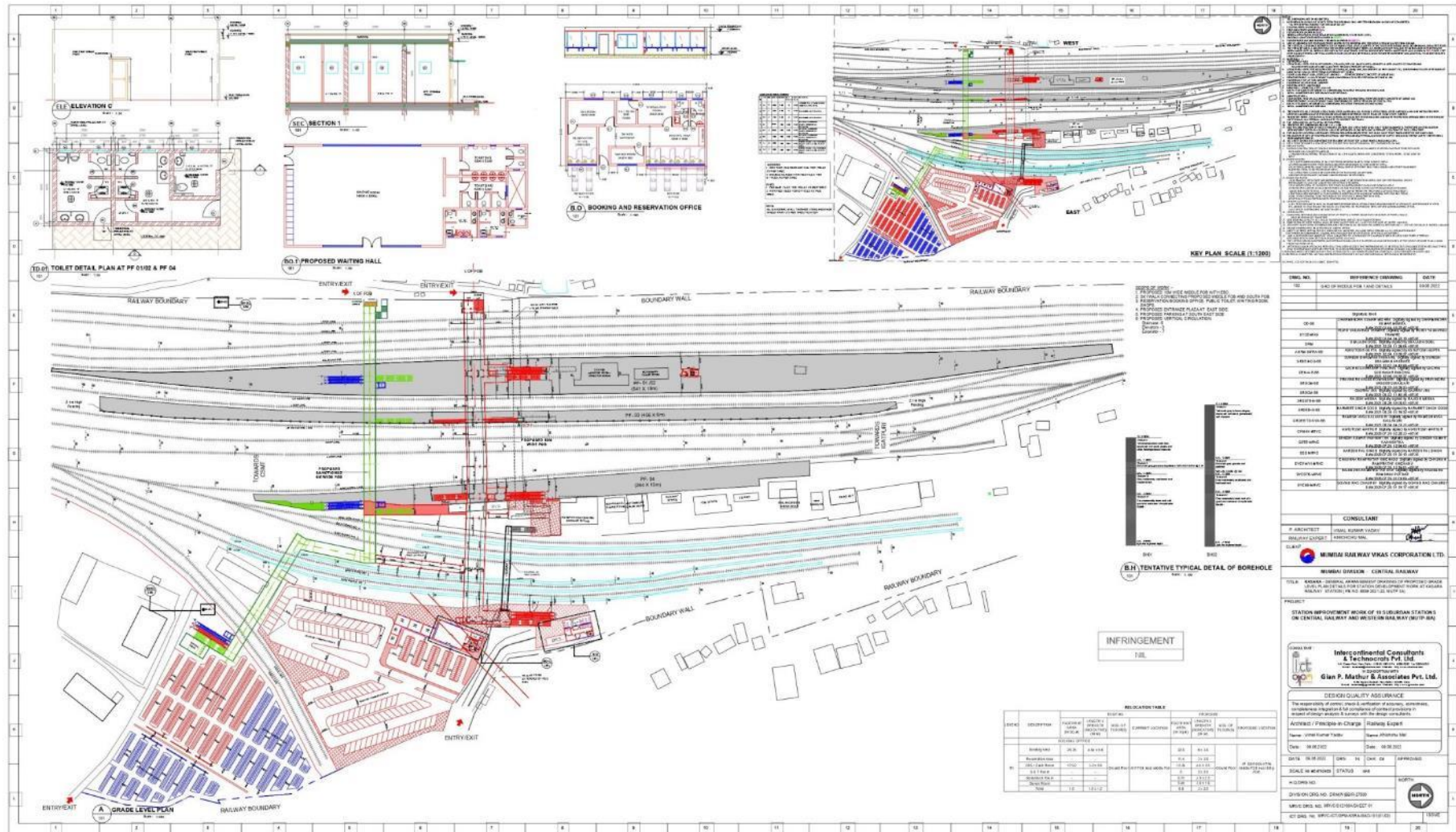
Proposal for development

The proposed development is shown in Figure 3.15.

Environmental and Social Impacts

The proposed improvement at Kasara station will not involve land acquisition and involuntary resettlement impact. However, two trees will likely be affected by the developments. Earlier, three private commercial units were operating in the project influence area, which are likely to be affected by the development. A Joint Site Visit was carried out by the MRVC Officials and RITES Team, and it was observed that these units will not be disturbed and can operate as usual during the construction phase.

Figure 3.15 Proposed Development at Kasara Station



GHATKOPAR STATION

Overview

Ghatkopar is a railway station on the Central Line of the Mumbai Suburban Railway network. It was opened in 1877 and serves the Ghatkopar suburb of Mumbai. It lies near the Ghatkopar market. The western side of Ghatkopar station is connected with the Ghatkopar metro station through a skywalk. The station can be reached by road on both East and West side.

General arrangement

The Ghatkopar station is one of the important stations as it has lot off commercial aspect for new development. The station has 4 platforms. Starting from platform no 1 at the west, to platform no 4 with passing lines on eastern side. The station has 3 FOBs. The major passenger flow is from western side, as the Metro station entry is from western side.

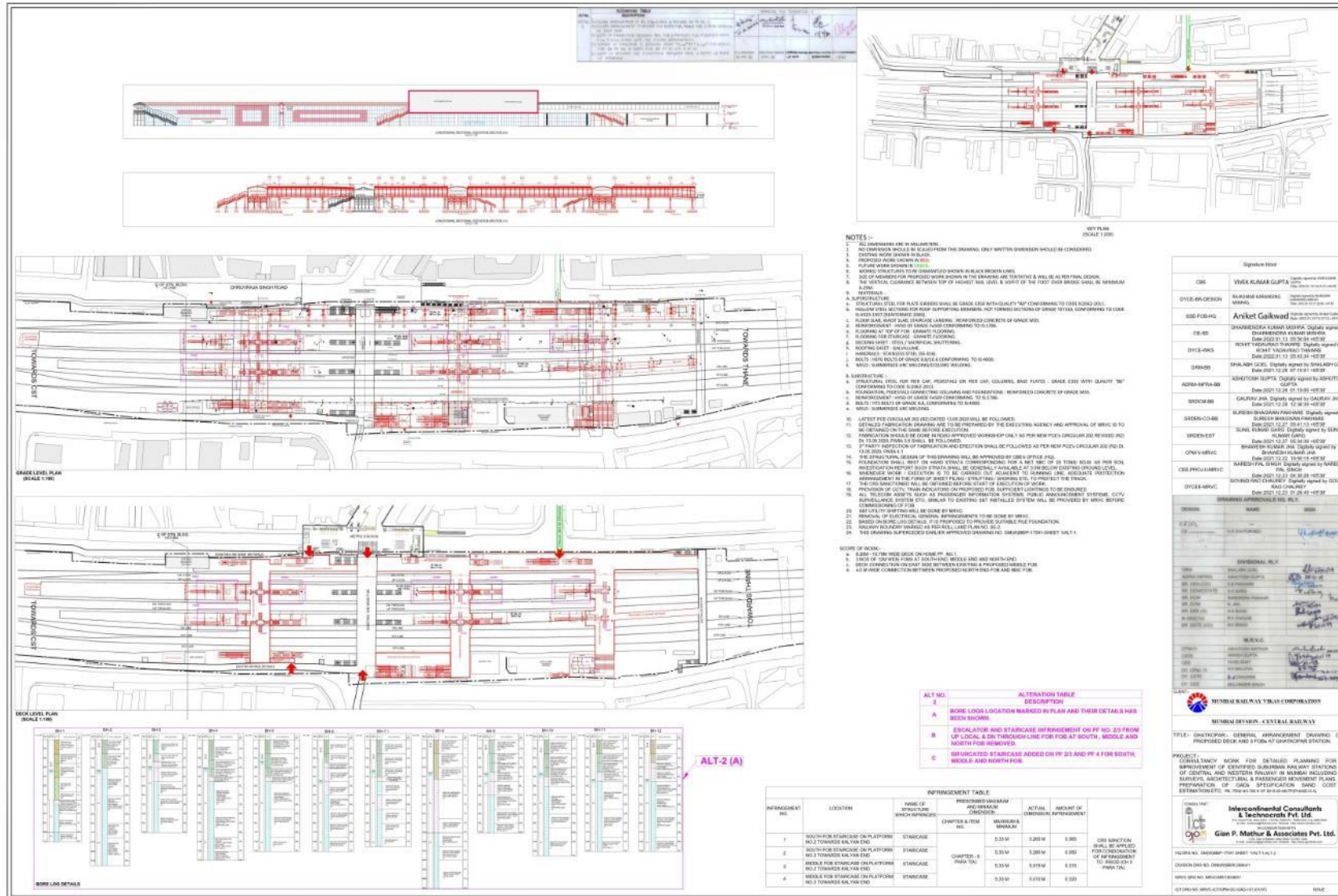
Proposal for development

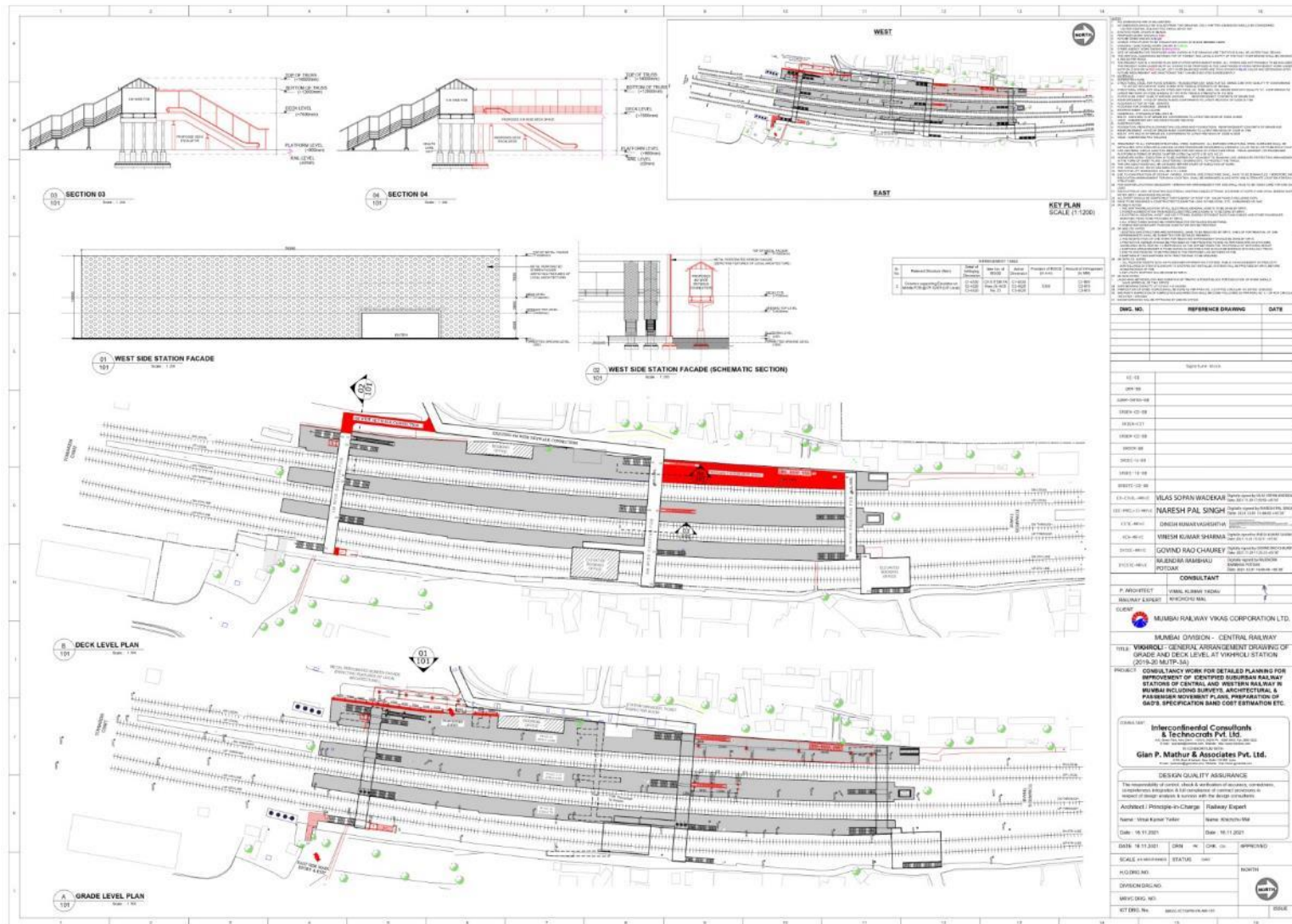
The proposed development is shown in Figure 3..

Environmental and Social Impacts

The proposed improvement at Ghatkopar station will not involve land acquisition and involuntary resettlement impact. Earlier, 223 commercial units (47 encroachers and 176 kiosks) were operating from the government land in the project influence area, which are likely to be affected by the development. A Joint Site Visit was carried out by the MRVC Officials and RITES Team, and it was observed that these units will not be disturbed and can operate as usual during the construction phase.

Figure 3.16 Proposed Development at Ghatkopar Station





SANTACRUZ STATION

Overview

Santacruz station is the 14th station from Churchgate station and 16th station from Virar station on the western route of suburban railways. The term Santacruz comes from the Portuguese words meaning "Holy Cross", to a 150-year-old Cross located on Chapel lane within the compound of a home for destitute women run by Mother Teresa's Missionaries of Charity trust. Santacruz is bordered by Vile Parle to the north, Khar to the south, Juhu to the west and Kurla, Bandra in the east. It is broadly divided in two areas: Santacruz (East) and Santacruz (West) by the Mumbai Suburban Railway line. The Milan Subway and Khar Subway connect the two areas, passing under the rail line. Recently Milan flyover has been built which has improved connectivity between Santacruz East and West. The Western express highway passes through Santacruz East. Because of its unique geography and connectivity, Santacruz is one of the prime locations in Mumbai.

MMRDA has built a Skywalk for pedestrians stretching from Podar School Complex (West Santacruz) to Western Express Highway (East Santacruz). The renowned destinations from these stations are Dawri Nagar, Vakola, Agripada, Kalina.

General arrangement

There are total 3 island platforms at this station. There are two booking offices. There is one elevator at the west side and other on the east side. There are total 3 FOBs which are located at North, South and middle of this station. North side FOB connects to all 6 platforms with skywalk in west. Middle FOB is connecting to elevated booking office and platform 3, 4, 5 & 6 with skywalk at west. South end FOB is connecting to skywalk, platform 3, 4, 5 & 6.

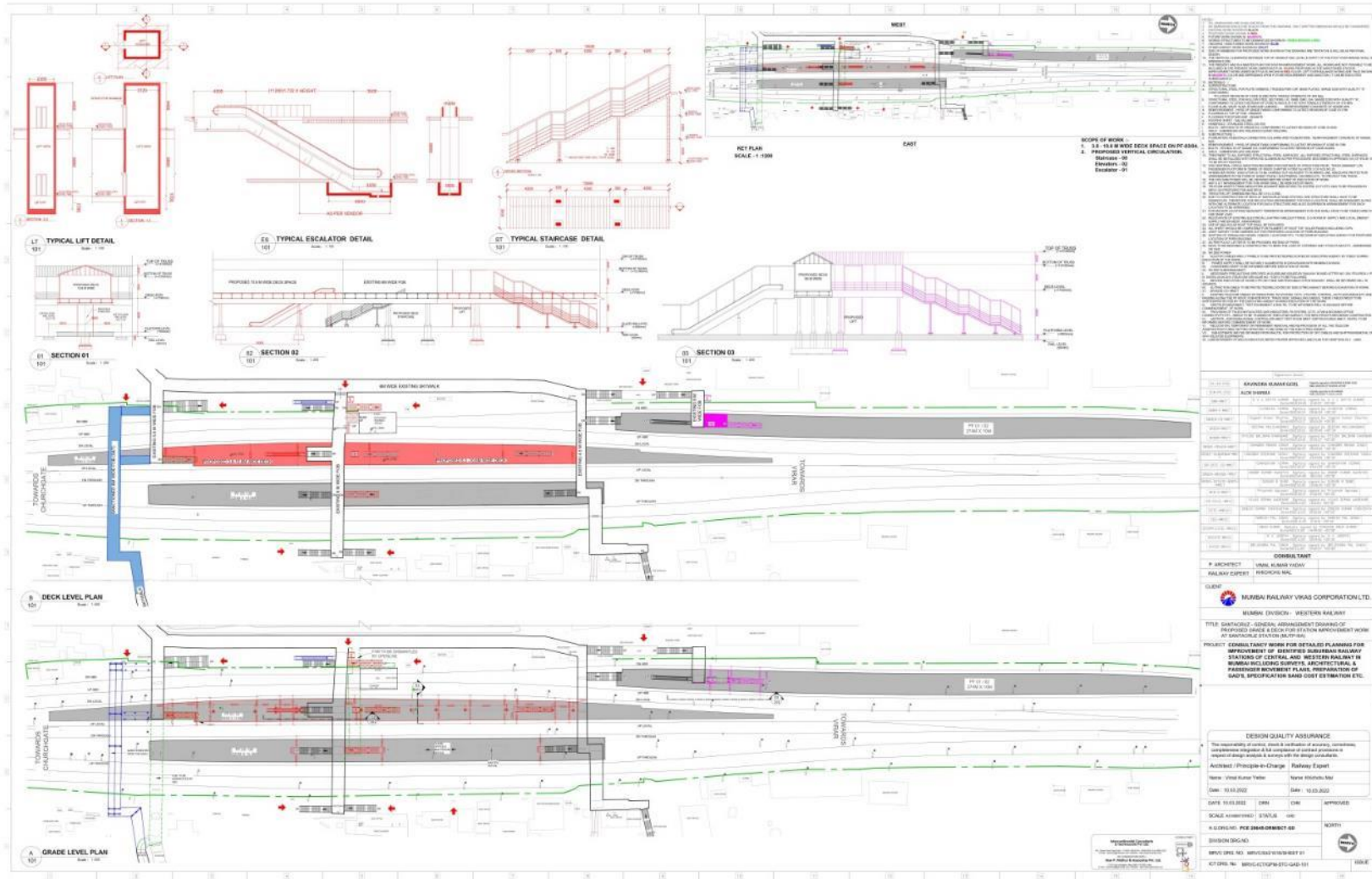
Proposal for development

The proposed development is shown in **Figure 3.17**.

Environmental and Social Impacts

The proposed improvement at Santacruz station will not involve land acquisition, involuntary resettlement, loss of trees and structures. The changes were made in the design to avoid environmental and social impact.

Figure 3.17: Proposed Development at Santacruz Station



3.4 Associated Facilities

As per the information shared by MRVC, no associated facilities will be developed along with this project.

3.5 Conclusion

The impacts shall be identified based on the proposed development described in this chapter and accordingly management plan has been prepared.

CHAPTER 4. ENVIRONMENT AND SOCIAL BASELINE

4.1 General

Environmental and social baseline data describes the existing environmental and social settings in the Project Aol. The objective of the Environmental and Social Impact Assessment (ESIA) is to ascertain the baseline environmental and social conditions and then assess the impacts as a result of the proposed project during various phases of the project cycle. The environmental and social baseline data has been compiled for:

- Physical (Physiography, Geology & Minerals, Soil, Water, Climate, Air, Noise and Vibration)
- Biological (Flora and Fauna – Terrestrial and Aquatic)
- Cultural Resources
- Socio-Economic

Environmental and social baseline data includes the physical, biological, cultural, and socio-economic data. The data collection was carried out in the months from October 2020 to December 2021. A scoping matrix along with the frequency adopted for data collection for environmental and social attributes is summarized in **Table 4-1**. Based on environmental and social scoping matrix and project settings the attributes likely to be affected were identified for baseline data generation.

Table 4-1: Environmental Attributes and Frequency of Monitoring

Sr. No	Attribute	Parameter	Frequency	Source
Physical Environment				
1.	Physiography			Secondary Data and GIS Study
2.	Geology and Minerals	Geological Status	---	Secondary Data
3.	Soil	Soil Characteristics	17 numbers of samples	Filed Studies and Secondary Data
4.	Seismology	Seismic Hazard	---	Secondary Data
5.	Water	Physical, Chemical and Biological parameters	17 numbers of samples	Filed Studies and Secondary Data
6.	Meteorology	Temperature, RH, Rainfall	---	India Meteorological Department
7.	Air	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ and CO	Twice a week for 1 month at 17 locations	Field Studies
8.	Noise	Noise levels in Db (A)	24 hrs at 17 locations	Field Studies

Sr. No	Attribute	Parameter	Frequency	Source
9.	Vibration	Peak Particle Velocity	24 hrs at 17 locations	Field Studies
Biological Environment				
10.	Flora and Fauna	Terrestrial and Aquatic	Once	Filed Studies and Secondary Data
Cultural Resources				
11.	Sensitive receptors	Religious structure, Archaeological sites, Paleontological, Historical, Architectural, Natural sites, Educational, Hospital	200 m from project boundary	Field Studies and GIS
Socio-Economic				
12.	Socio-Economic aspects	Socio-economic characteristic	Once	Field Studies, Literature review.

4.2 Physical Environment

Field studies were carried out for collection of baseline data with respect to physical environment viz. Physiography, geology, soils, minerals, drainage, land use pattern, seismicity, water, air, noise and vibration. The data on physical environment was collected from existing literature and from field observations.

4.2.1 PHYSIOGRAPHY

The proposed project falls in Mumbai, Mumbai Suburban, Thane and Raigad Districts of Maharashtra State. The physiographic features of the Mumbai and Mumbai Suburban district are broad and flat terrain flanked by north- south trending hill ranges; physiographic feature of Thane District is undulating hilly tract and coastal plain in western part; and physiographic feature of Raigad District is Coastal zone, Central zone and Hilly Zone in eastern part of the district.

4.2.2 GEOLOGY AND MINERALS

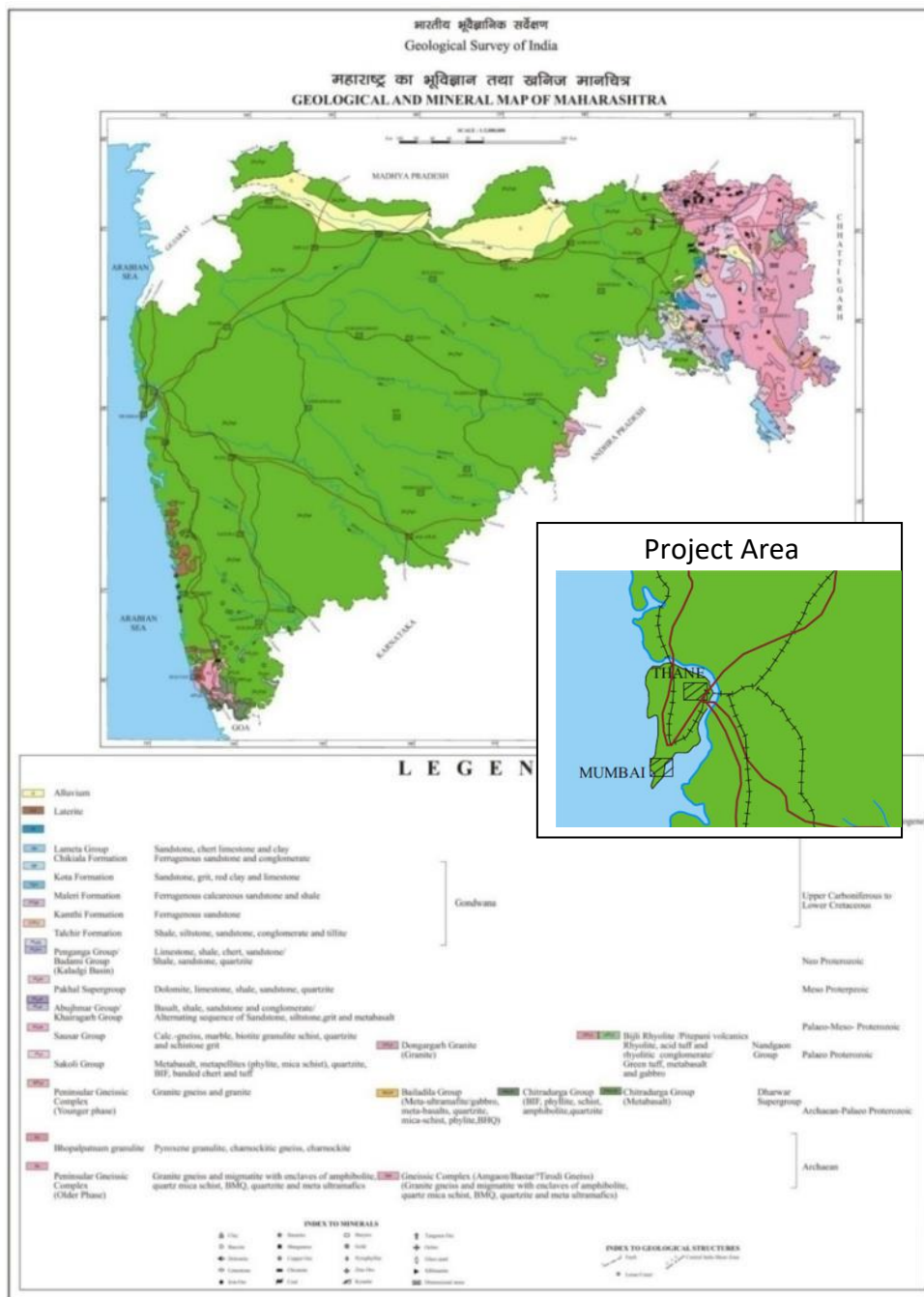
Mumbai and Mumbai Suburban districts: The entire districts are underlain by basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow Alluvium formation of recent age also occurs as narrow stretch along the major rivers flowing in the area.

Thane District: Deccan TRP Basalt of Upper Cretaceous to Lower Eocene age is the major rock type covering about 80% of the district, coastal alluvium is other formation occurring only in western end of the district.

Raigad District: Deccan TRP Basalt of upper Cretaceous to lower Eocene is the major rock formation and intruded by a number of dykes. The western part of the district consisting Basalt flows are altered to Laterite. Recent deposits comprising Beach Sand and Alluvium occur along the coast and in the river mouth.

The basalt is a predominant rock formation under Deccan TRPs in the proposed Project Aol. No minerals are available in and around the Project Aol. Geological and Mineral Map of Maharashtra State is shown in is shown in **Figure 4.1**.

Figure 4.1 Geological and Mineral Map of Maharashtra



Source: Geological Survey of India

4.2.3 SOILS

Soil is the material found on the surface of the earth that is composed of organic and inorganic material. Soil varies due to its structure and composition. The physical and chemical characters of the parent rock, physiography, altitude, climatic condition and plants and animals of the surrounding region influence the process of soil formation. Most of the soils in Project Aol can be considered as being derived from TRP (Basaltic) rocks. The predominant soil cover in Mumbai and Mumbai suburban districts are medium to deep black and reddish soil. In Raigad district, the soils are black soil, khar or salt soil, coastal alluvium and laterite soils. The soils in the Thane district are soils of coastal lands with residual hills, lighter colored soils, and black colored soils.

In the Project Aol, Soil samples from 17 locations were collected and analyzed to establish the baseline characteristics and assess the anticipated impacts due to proposed project. The description of Soil quality monitoring locations is given in **Table 4-2** and the sample locations are shown in **Figure 4.2**. These samples were tested in the laboratory to determine the nature and physical characteristics like soil classification, nutrient contents, electrical conductivity, etc. The results of the soil sample analysis are given in **Table 4-3**.

Table 4-2: Description of Soil Quality Monitoring Locations

Sr. No.	Sample ID	Location	Date of Sampling	Criteria for Selection	Environmental Setting
1.	SS1	Bhandup	24/11/2020	Near the Proposed Project	Open area
2.	SS2	Mulund	23/11/2020		Open area with small Grass
3.	SS3	Dombivli	23/11/2020		Open area
4.	SS4	Ghatkopar	25/11/2020		Open area
5.	SS5	Neral	23/11/2020		Open area
6.	SS6	Kasara	23/11/2020		Open area
7.	SS7	GTB Nagar	24/11/2020		Garden
8.	SS8	Chembur	22/11/2020		Garden
9.	SS9	Govandi	24/11/2020		Open area
10.	SS10	Mankhurd	23/11/2020		Open area with small Grass
11.	SS11	Mumbai Central (Local)	24/11/2020		Open area
12.	SS12	Santacruz	22/11/2020		Open area with small Grass
13.	SS13	Kandivali	22/11/2020		Open area
14.	SS14	Mira Road	22/11/2020		Garden
15.	SS15	Bhayandar	22/11/2020		Garden
16.	SS16	Vasai Road	22/11/2020		Garden
17.	SS17	Nalla Sopara	22/11/2020		Open area

From the laboratory analysis report, following features have been observed

- The Ph value of Project Aolvaried from 6.26-6.67. It was observed that the soil reaction was slightly acidic in nature.
- The electrical conductivity in theProject Aol is varying from 34 – 53 $\mu\text{S}/\text{cm}$.
- Available nitrogen status in soils of Project Aolvaried from 371.38 – 645.00 kg N /ha. On the basis of the ratings suggested by Subbiah and Ashija (1956) all the samples were rated in medium range.
- Plant available phosphorus contents in soils of project site varied from 24-56. 29 kg/ha. According to soil fertility index suggested by Muhar et al. (1963) all samples were found in higher range.
- Available Fe content in the soil ranged from 0.37 – 0.93 mg/kg. All the soil samples were found insufficient amount of available iron considering 4.5 mg/ kg as a critical limit suggested by Lindsay and Norvell (1978).
- Texture class of the soil is sandy soil.

Overall soil quality data reveal that soil is deficient in Nitrogen and Phosphorous; natural soil amendment with Farmyard manure and vermin compost may be used for improving these parameters. Growing of local (native) plant species is required for greenbelt development to improve the soil quality.

Figure 4.2 Soil Quality Monitoring Locations

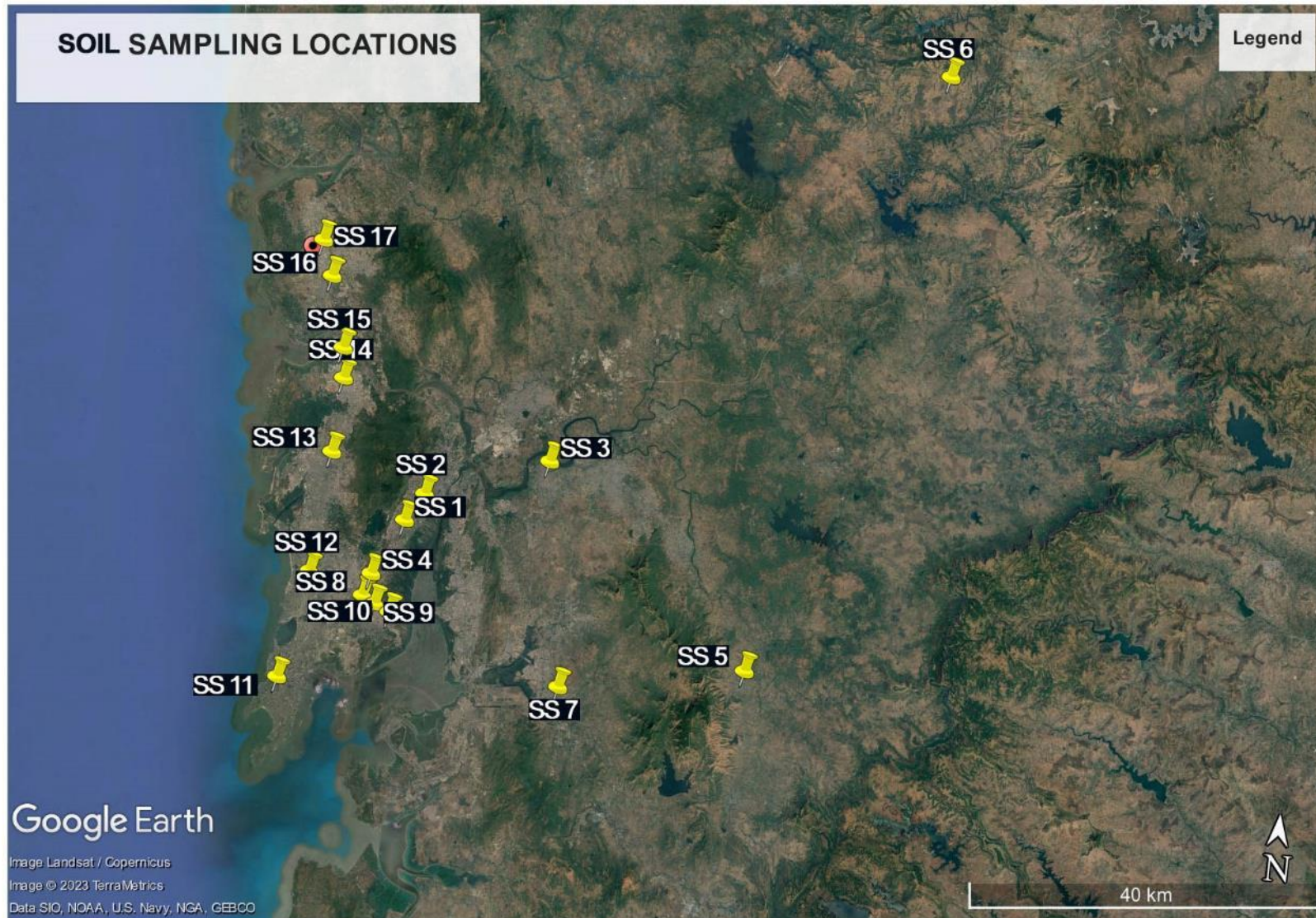


Table 4-3: Soil Sample Analysis Results

S. No	PARAMETER	UNIT	SAMPLE NO																
			SS 1	SS 2	SS 3	SS 4	SS 5	SS 6	SS 7	SS 8	SS 9	SS 10	SS 11	SS12	SS13	SS14	SS15	SS16	SS17
1.	Ph	-	5.71	6.68	6.19	5.94	5.95	6.67	5.59	6.01	5.41	6.03	5.29	5.39	6.09	5.26	6.01	5.4	5.43
2.	Moisture content	%	19.87	18.85	19.39	18.39	19.24	20.08	19.63	17.12	19.37	21.24	18.23	19.54	18.24	17.19	19.23	16.25	18.47
3.	Electrical conductivity	μS/cm	49	43	41	49	48	53	39	41	34	53	41	49	49	39	51	45	46
4.	Organic matter	%	2.14	2.43	2.12	2.13	2.28	1.97	2.03	2.09	2.01	2.56	1.75	1.87	1.54	1.83	1.66	1.74	1.76
5.	Available Nitrogen	Kg/ha	408.63	397.63	383.54	473.24	371.58	354.23	543	489	527	398.43	591	628	631	633	645	633	631
6.	Available phosphorous (P2O5)	Kg/ha	56.29	55.31	54.87	48.12	50.27	49.36	37.24	34.61	32.41	52.91	39.24	43.29	39	26	31	26	24
7.	Available Potassium (K2O)	Kg/ha	386.62	343.26	327.32	354.61	307.45	298.49	351.23	354.37	352.36	362.58	257.84	263.13	267.46	309.16	289.13	321.4	301.45
8.	Texture																		
	i) Sand	%	88.73	89.21	88.85	88.81	88.64	89.15	88.95	89.11	88.45	88.29	88.71	89.06	88.94	88.69	89.61	88.47	89.45
	ii) Silt	%	8.54	8.66	9.04	9.11	9.13	8.68	9.02	8.46	8.86	8.56	8.84	8.92	8.87	8.56	8.26	8.63	9.24
	iii) Clay	%	2.73	2.13	2.11	2.08	2.23	2.17	2.03	2.43	2.69	2.15	2.45	2.02	2.19	2.75	2.13	2.9	1.31

S. No	PARAMETER	UNIT	SAMPLE NO																
			SS 1	SS 2	SS 3	SS 4	SS 5	SS 6	SS 7	SS 8	SS 9	SS 10	SS 11	SS12	SS13	SS14	SS15	SS16	SS17
9.	Calcium	%	5.84	6.56	6.14	6.12	5.93	5.63	5.21	5.76	6.09	6.02	5.94	6.32	5.63	6.24	6.03	5.12	5.56
10.	Magnesium	%	0.71	0.76	0.54	0.71	0.61	0.65	0.69	0.63	0.71	0.65	0.73	0.89	0.81	0.84	0.84	0.91	0.79
11.	Zinc	mg/kg	2.08	2.19	2.08	1.45	2.01	2.32	1.95	1.76	1.91	2.12	2.01	1.54	1.21	1.63	1.26	1.23	1.23
12.	Boron	mg/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.	Iron	mg/kg	0.69	0.82	0.93	0.65	0.84	0.73	0.48	0.37	0.41	0.71	0.53	0.65	0.53	0.71	0.59	0.6	0.64

Source: RITES Field Studies November 2020

4.2.4 LAND USE PATTERN

Land use patterns are important in Environmental Impact Assessment study as it describes its use such as agriculture, settlement, forest, vegetation, etc. Land use / Land cover (Built-up Land, Agricultural Land, Forest, Barren Lands, Water Bodies, Roads, and Others) for Project AoI of 5 km on either side from proposed Railway Station has been derived from latest satellite imagery

The satellite image used in the current study includes 4 satellite scenes of LISS-IV data of Resourcesat-2A given in **Table 4-4**. The entire data is in Universal Transverse Mercator projection system with spheroid and datum as WGS84 and Zone as 43.

Table 4-4: Satellite Images

Sr. No.	Satellite/Sensor	Row	Path	Sub-Scene	Date of Pass
1.	IRS-R2A/LISS-IV	058	094	D	15-November-2020
2.	IRS-R2A/LISS-IV	059	094	A	08-November-2020
3.	IRS-R2A/LISS-IV	059	094	B	04-September-2020
4.	IRS-R2A/LISS-IV	059	094	D	04-September-2020

Land use Map: The Land use map was prepared using on-screen visual interpretation technique using ERDAS Imagine and Arc GIS software. The land use classes that has been identified includes Agriculture, Airport, Barren, Canal, Dry River/River Sand, Dumping Ground, Golf Course, Helipad, Industrial Area, Island, Jetty, Mangrove, Metro Station, Mixed Settlement, Moderately Dense Forest, Open Forest, Open Land, etc. Covering a total area of 1674.38 sq km. The land use statistics work out from GIS study is given in **Table 4-5** and Land use map are shown in **Figure 4.3**. The land use of the Project AoI is predominately settlement followed by scrub and sea.

Table 4-5: Land Use Classification on 5 km on Either Side of Proposed Railway Stations

S. No.	Land Use and Land Cover	Area (sq. Km)	Area (%)
1.	Agriculture	75.31	4.50
2.	Airport	6.43	0.38
3.	Barren	57.26	3.42
4.	Canal	0.65	0.04
5.	Cloud	5.72	0.34
6.	Dry River / River Sand	0.6	0.04
7.	Dumping Ground	0.42	0.03
8.	Golf Course	1.05	0.06
9.	Helipad	0.26	0.02
10.	Industrial Area	18.11	1.08
11.	Island	0.01	0.00
12.	Jetty	0.18	0.01
13.	Mangrove	100.22	5.99

S. No.	Land Use and Land Cover	Area (sq. Km)	Area (%)
14.	Metro Station	0.11	0.01
15.	Mixed Settlement	0.48	0.03
16.	Moderately Dense Forest	90.02	5.38
17.	Open Forest	115.57	6.90
18.	Open Land	4.37	0.26
19.	Orchard	27.74	1.66
20.	Play Ground	0.05	0.00
21.	Port	0.92	0.05
22.	Power Station	0.29	0.02
23.	Race Course	0.4	0.02
24.	Railway Godown	0.22	0.01
25.	Railway Station	1.55	0.09
26.	Railway Track	4.78	0.29
27.	Railway Workshop	0.55	0.03
28.	Railway Yard	2.18	0.13
29.	River	60.83	3.63
30.	Road	42.2	2.52
31.	Salt Pans	66.93	4.00
32.	Sand Bar	5.77	0.34
33.	Scrub/Grasses	259.83	15.52
34.	Sea	194.74	11.63
35.	Settlement	460.4	27.50
36.	Vegetated Area	41.96	2.51
37.	Waterbody	18.12	1.08
38.	Waterbody (Dry)	0.18	0.01
39.	Wetland	7.97	0.48
	Total	1674.38	100.00

Figure 4.3: Land use Map 5 Km on either Side of 17 Proposed Railway Station

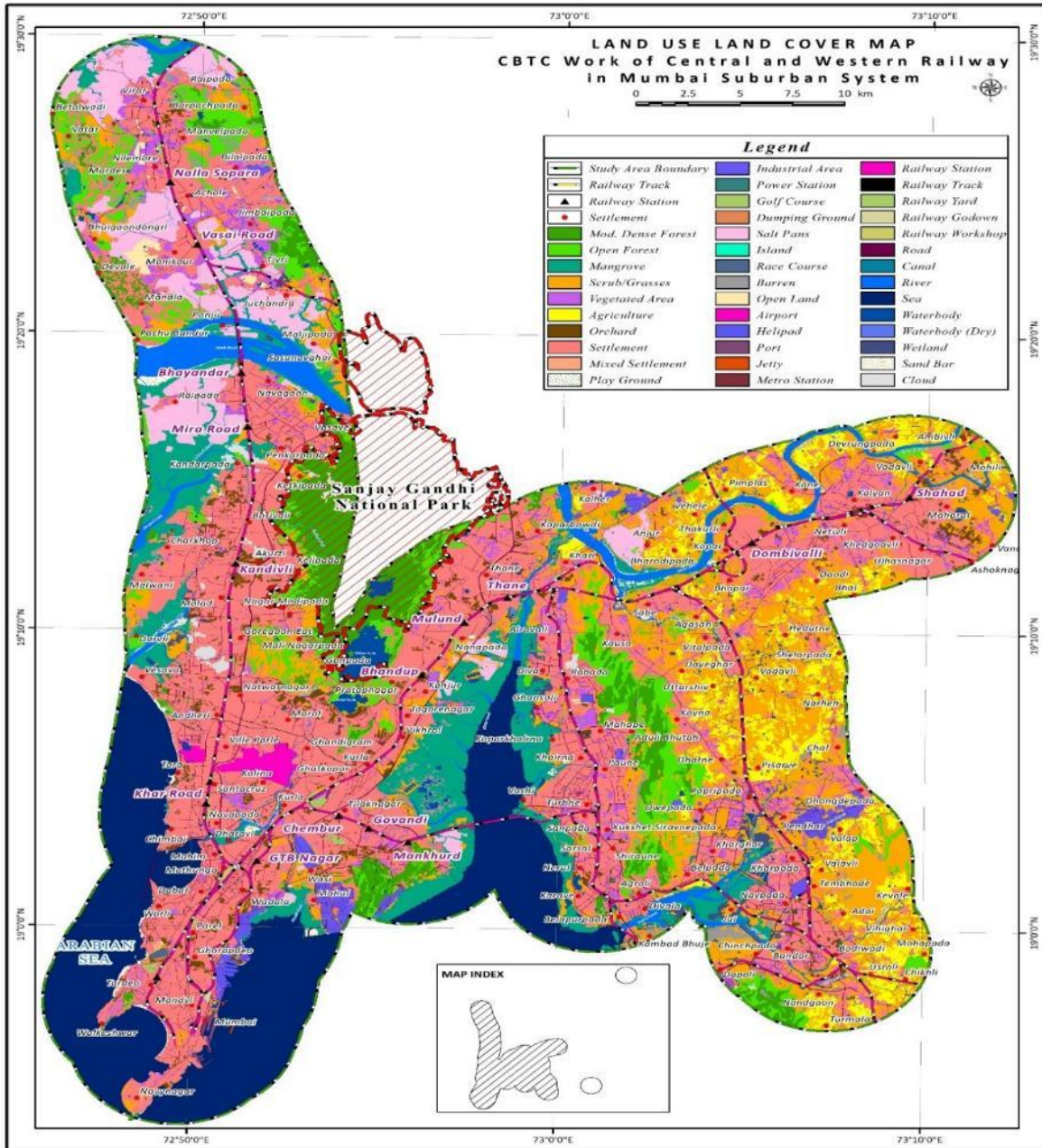


Figure 4.4 Land use Map 5 Km on Either Side of Kasara Railway Station

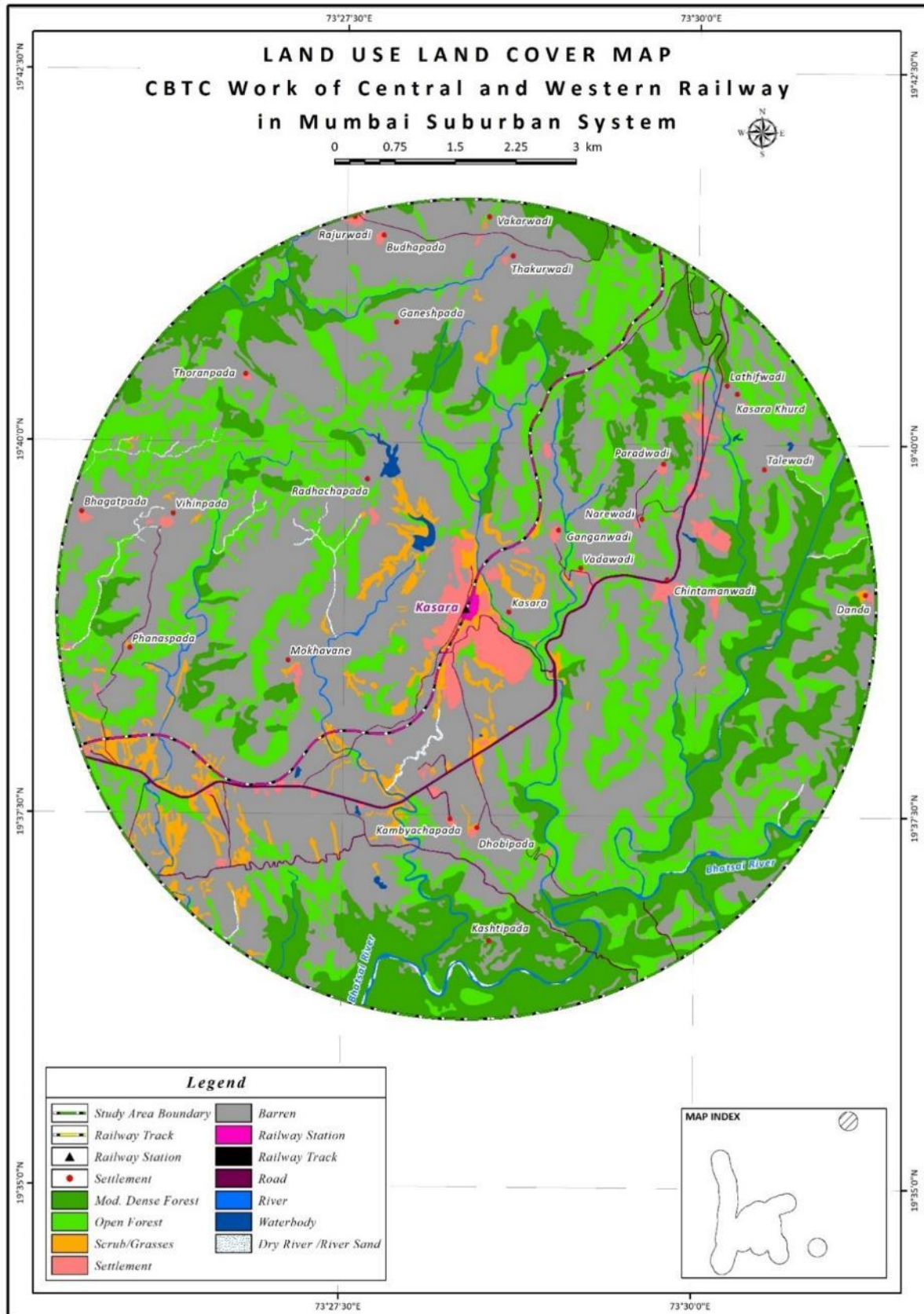
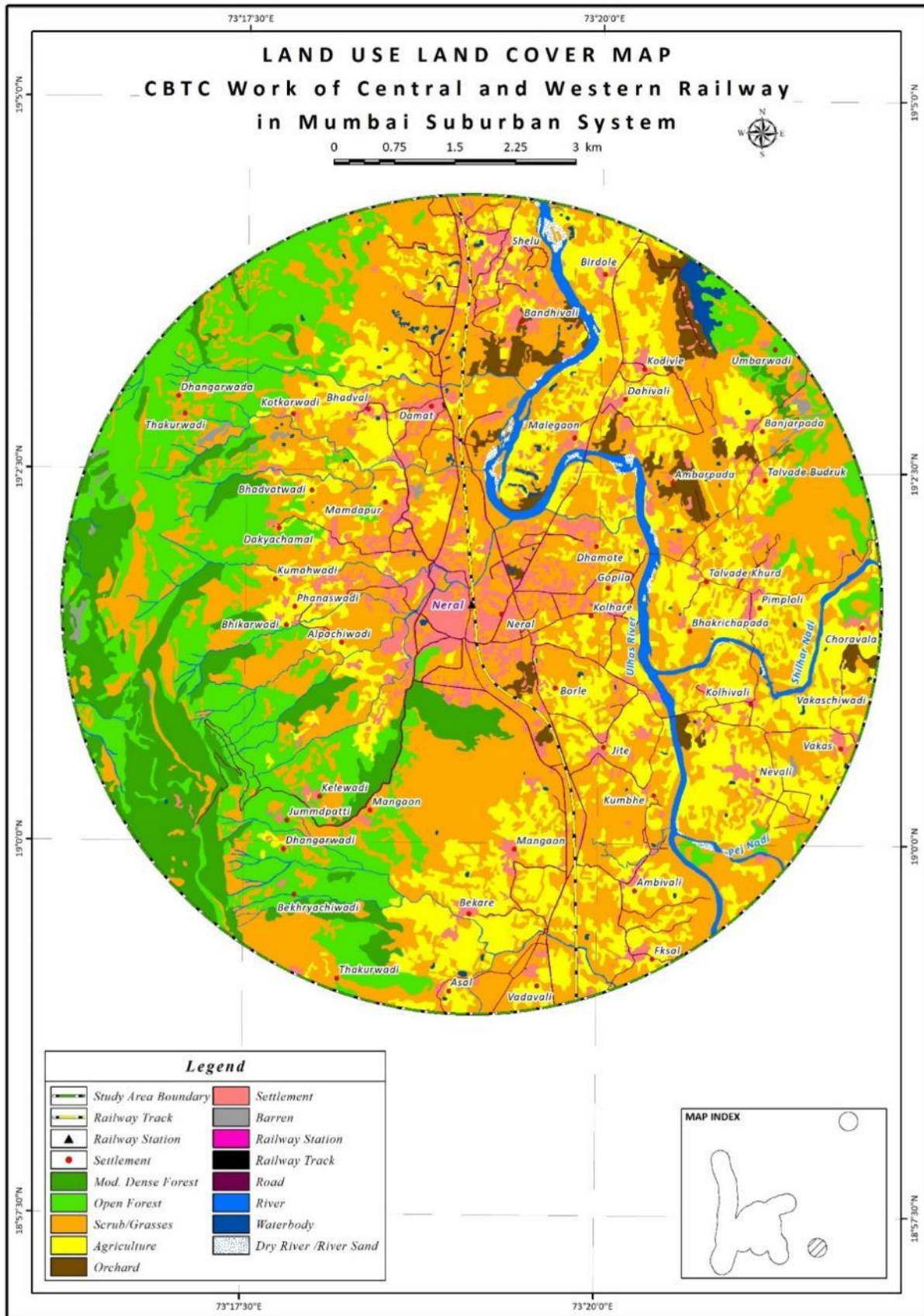


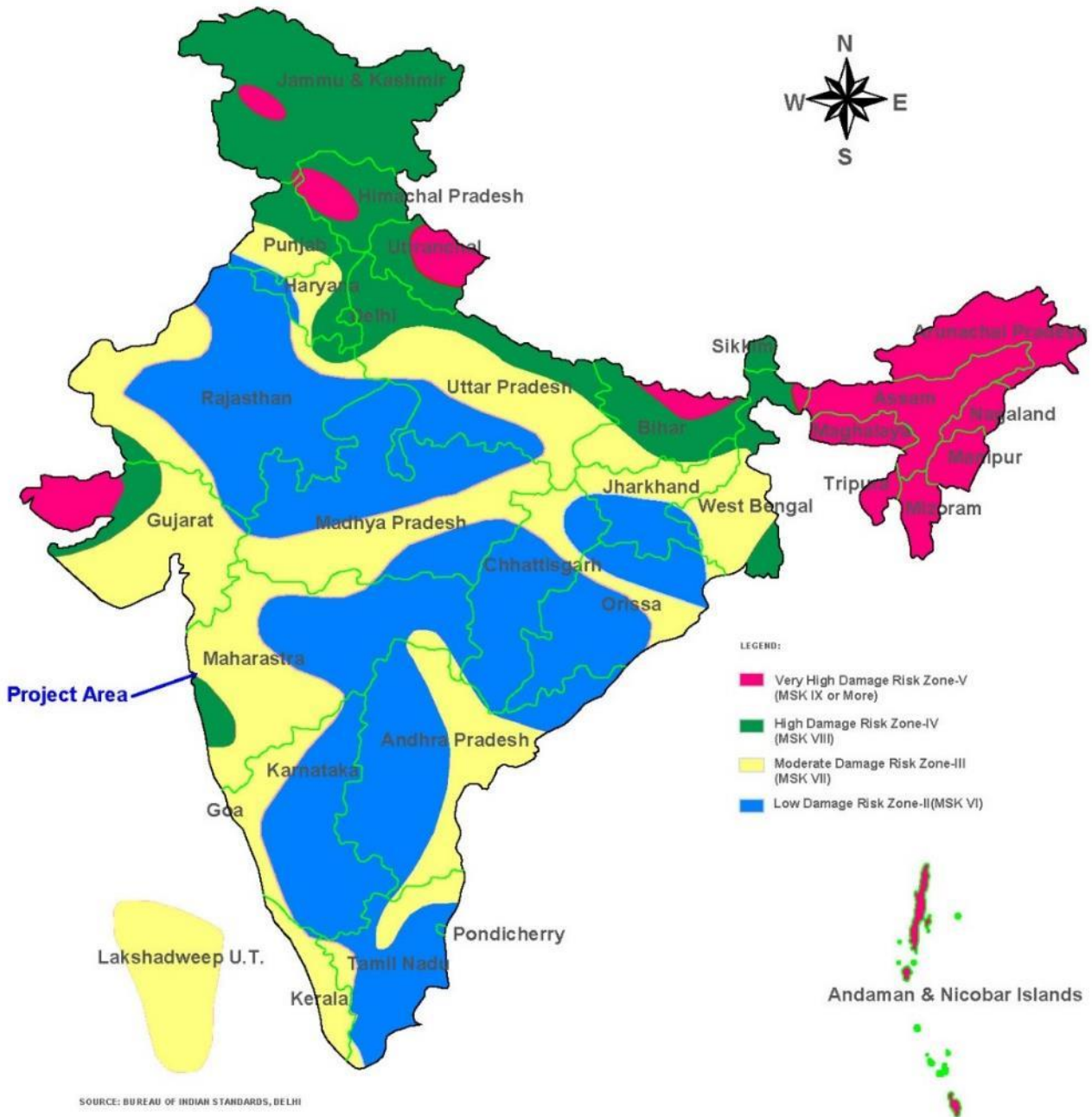
Figure 4.5 Land use Map 5 Km on Either Side of Neral Railway Station



4.2.5 SEISMICITY

The state of Maharashtra falls in a region of Low Damage Risk Zone (Zone II), Moderate Damage Risk Zone (Zone III) & High Damage Risk Zone (Zone IV) as per revised seismic zoning map of India. The proposed Project AoI falls in Zone III as per revised seismic zoning map of India as shown in **Figure 4.6**.

Figure 4.6: Seismic Zoning Map of India



4.2.6 WATER

Water consists of water resources and its quality. Its study is important from the point of view to assess the sufficiency of water resources for the needs in various stages of the project cycle and also to assess the impact of the project activities on water environment.

Water Resources of the District: The source of water supply in the Project Aol is mainly surface water. The water supply in Mumbai comes from outside the city. Bhatsa Lake, Upper Vaitarna Lake, Modak Sagar Lake, Tulsi Lake, Tansa Lake and Vihar Lake supplies about 3,450 MLD of water to the city. Most of the water distribution system in Mumbai is more than 100 years old. Water is supplied to the city from the lakes after treatment and stored in 23 service reservoirs.

In Navi Mumbai, CIDCO has planned its own water supply project schemes at Hetawane, Morbe and Balganga. Water Supply to Navi Mumbai is supplied through the Morbe Dam, which is owned by the Navi Mumbai Municipal Corporation (NMMC) and has the capacity to provide 450 MLD water. The Hetawane Water Supply Project, which is owned by the Irrigation Department and has a capacity to provide 350 MLD water. The Balganga Dam Project has a capacity of 350 MLD.

As per Central Ground Water Board data in Mumbai and Navi Mumbai districts the ground water quality in the wells monitored is within the BIS standard conditions; in Thane district the ground water quality in the wells monitored is not much affected and ground water in general potable; in Raigad district the ground water quality in the wells monitored in the district is not much affected. The quality of ground water of deeper aquifer is brackish to slightly saline in some localities in the Project Aol. This may be due to ingress of sea water.

Drainage Map: The Project Aol is drained by Mahim, Mithi, Dahisar and Polsar rivers. These small rivers near the coast, form small rivulets which intermingle with each other resulting in swamps and mud flats in the low-lying areas. Gadi River (Panvel River) that take its birth near Sahyadri Mountains and flows towards Southwest along the Panvel city drains its water in the Panvel creek. Two very small rivers namely; Taloja and Nawade are active only during the rainy season and ultimately join the Panvel creek. Thane district drains by two major rivers namely, Ulhas and Vaitarna. The river Vaitarna rises near Trimbak hills in Nashik district, opposite source of Godavari River and enters in study region at Vihigaon near Kasara, flows across Shahapur, Vada and Palghar tahsils and enters the Arabian Sea through a wide estuary off Arnala. The Drainage map was prepared using 1: 50,000 Scale topographical sheet of Survey of India and updated using the satellite images as of the present condition, the entire Project Aol is covered under the open series topographical sheet number 47A/15, 47A/16, 47B/13, 47E/03, 47E/04, 47E/06, 47E/08, 47E/10, 47F/01, and 47F/05. The drainage was digitized using heads-up digitization technique using Arc Map. Drainage map of Project Aol is shown in **Error! Unknown switch argument. to Figure 4.9.**

Figure 4.7 Drainage Map 5 Km on Either Side of 17 Proposed Railway Station

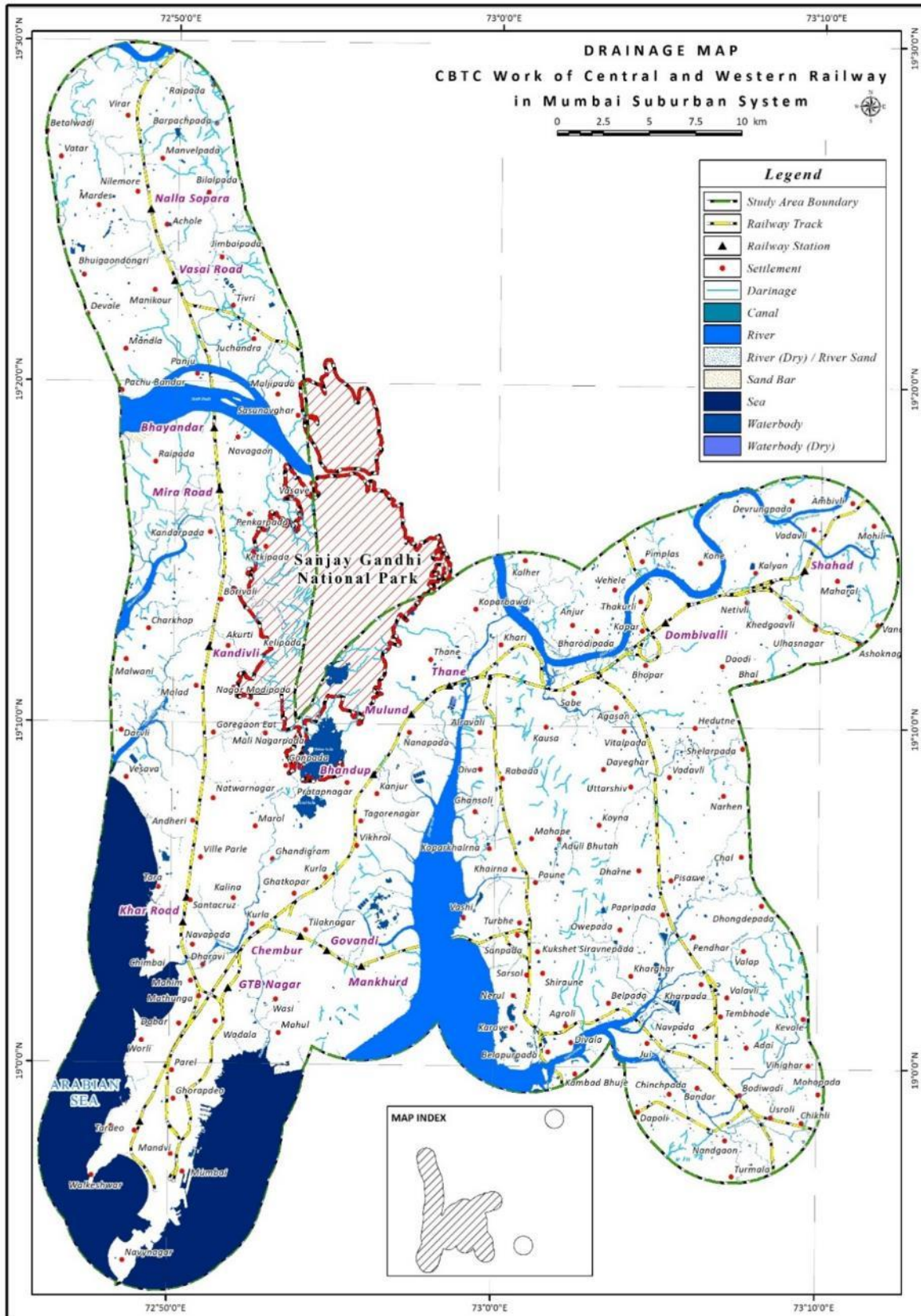


Figure 4.8 Drainage Map 5 Km on Either Side of Proposed Kasara Railway Station

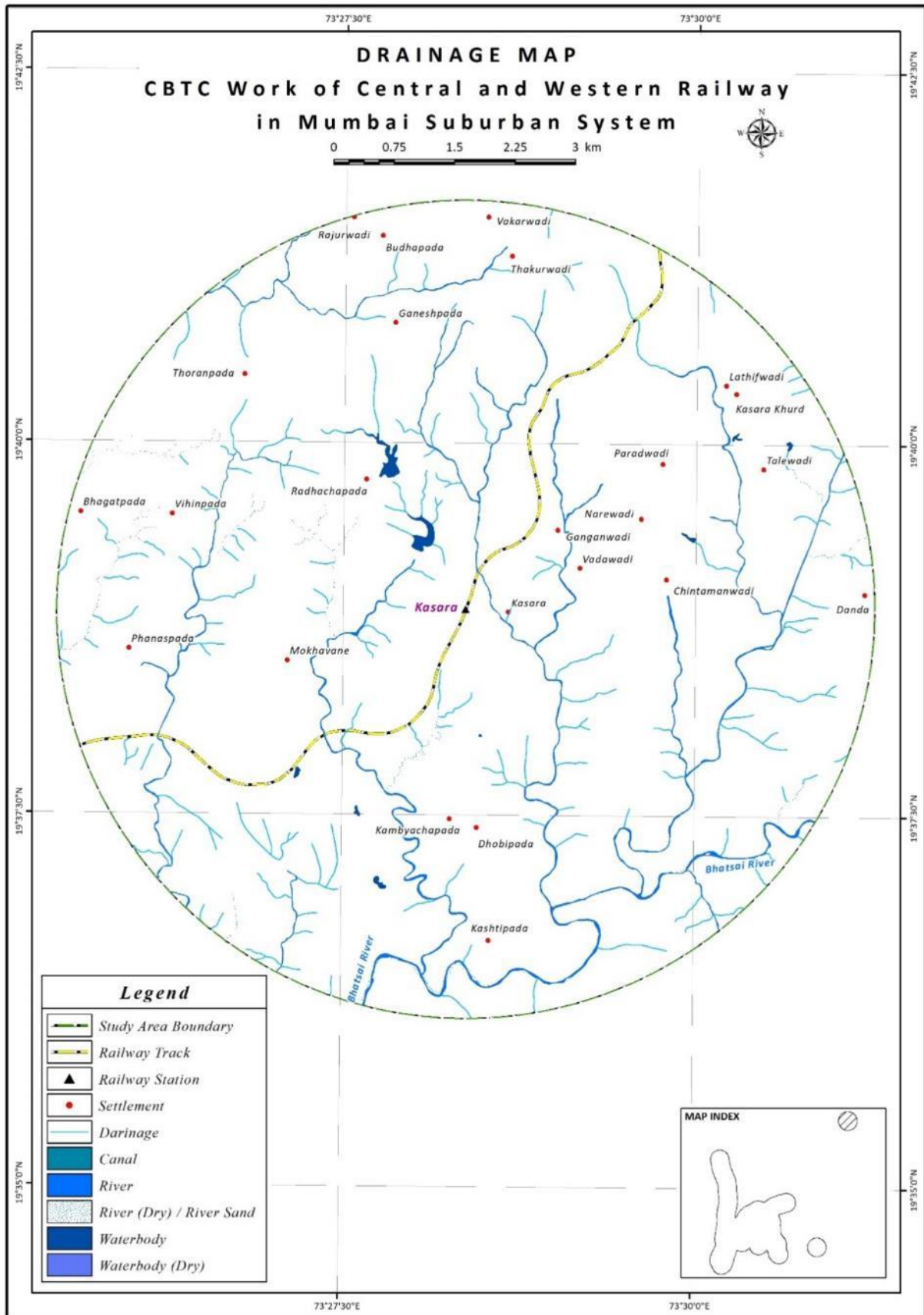
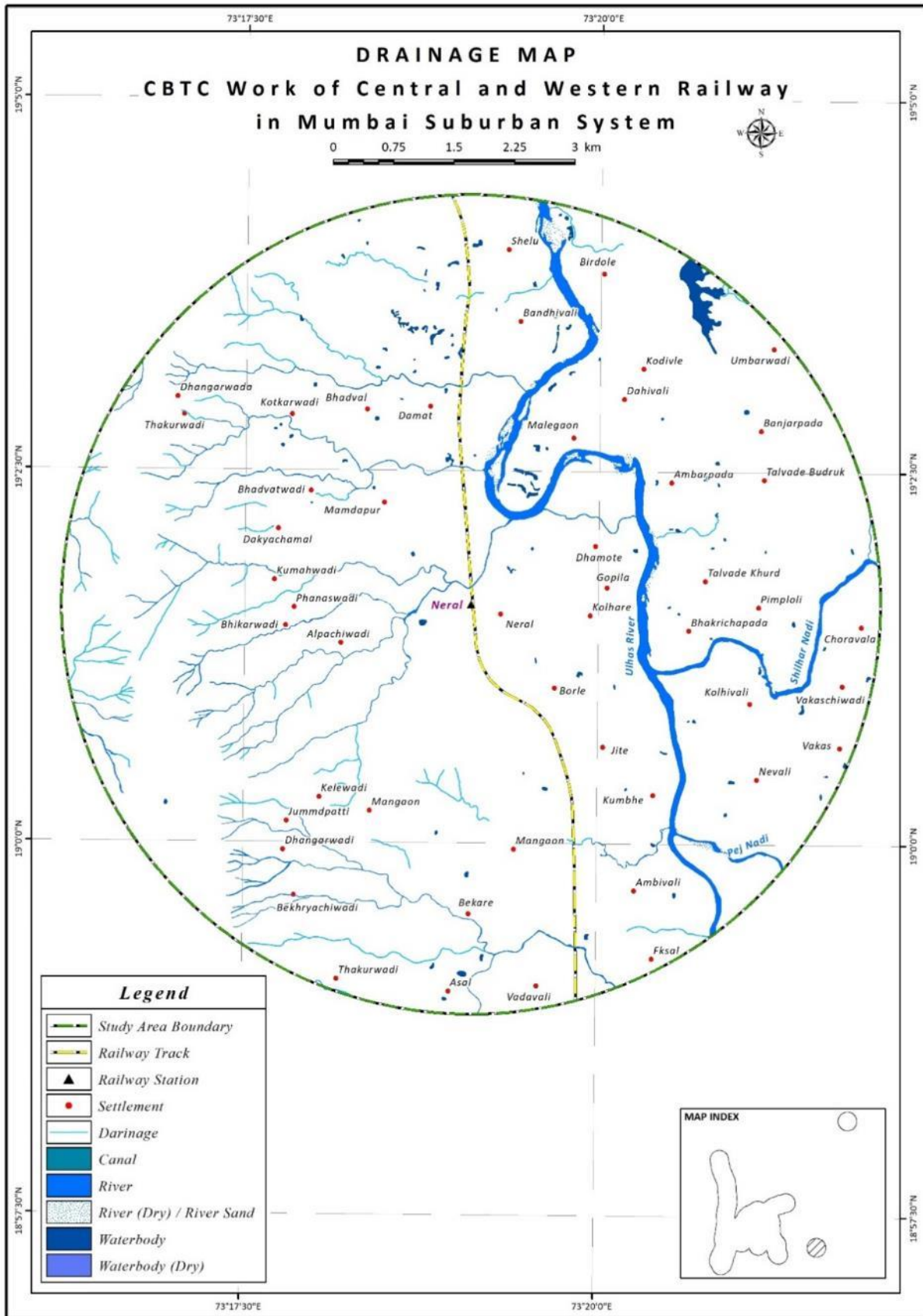


Figure 4.9 Drainage Map 5 Km on Either Side of Proposed Neral Railway Station



Water Quality of the Project Aol: In order to assess the baseline water quality status of the Project Aol, seventeen (17) samples were collected in the Project Aol. The sample locations are shown in **Figure 4.10** and description of water quality monitoring locations are given in **Table 4-6**.

Table 4-6: Description of Water Quality Monitoring Locations

Sr No.	Sample ID	Location	Date of Sampling	Criteria for Selection	Type of Sample
1.	WS1	Bhandup	24.11.2020	Near the Proposed Project	Ground
2.	WS2	Mulund	23/11/2020		Ground
3.	WS3	Dombivli	23/11/2020		Ground
4.	WS4	Ghatkopar	24.11.2020		Ground
5.	WS5	Neral	23/11/2020		Ground
6.	WS6	Kasara	23/11/2020		Ground
7.	WS7	GTB Nagar	24.11.2020		Ground
8.	WS8	Chembur	24.11.2020		Ground
9.	WS9	Govandi	24.11.2020		Ground
10.	WS10	Mankhurd	23/11/2020		Ground
11.	WS11	Mumbai Central (Local)	24.11.2020		Ground
12.	WS12	Santacruz	22.11.2020		Ground
13.	WS13	Kandivali	22.11.2020		Ground
14.	WS14	Mira Road	22.11.2020		Ground
15.	WS15	Bhayandar	22.11.2020		Ground
16.	WS16	Vasai Road	22.11.2020		Ground
17.	WS17	Nalla Sopara	22.11.2020		Ground

The samples were analysed for physical and chemical constituents of Ground water analysis are compared with CPHEEO manual for Drinking Water Specifications and found all parameters are within permissible limits. The results of sample testing are presented in **Table 4-7**.

Figure 4.10 Water Quality Monitoring Locations

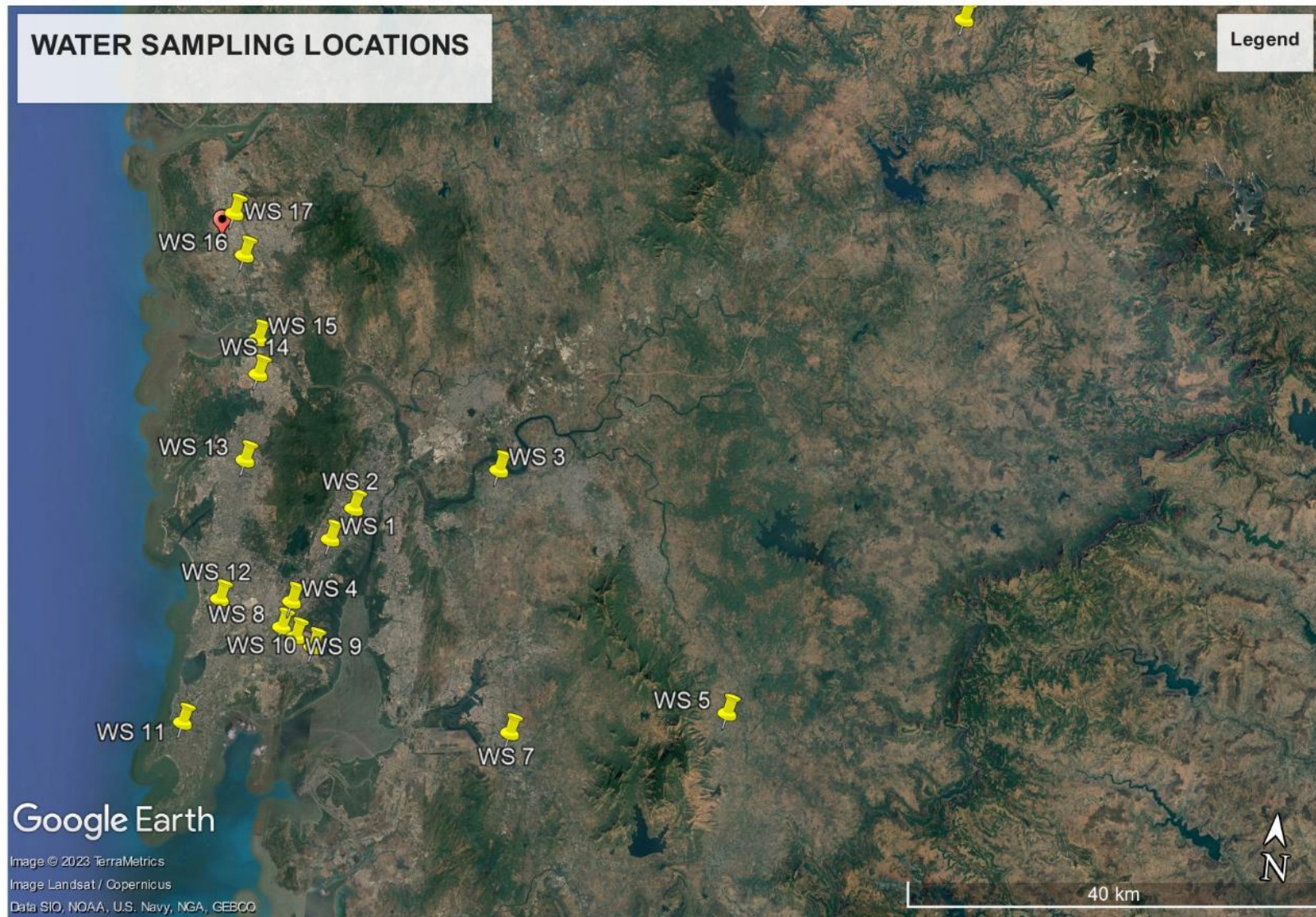


Table 4-7: Water Sample Analysis Results

S. No	PARAMETER	UNIT	WS 1	WS 2	WS 3	WS 4	WS 5	WS 6	WS 7	WS 8	WS 9	WS 10	WS 11	WS 12	WS 13	WS 14	WS 15	WS 16	WS 17
1.	Ph	-	7.43	7.64	7.43	7.57	7.69	7.39	7.53	7.75	7.66	7.69	7.39	7.14	7.36	7.18	7.12	7.2	7.47
2.	Turbidity	NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU	<1 NTU
3.	Total Hardness	mg/l	153. 24	215. 39	163. 24	139. 45	134. 26	91.2 8	117. 37	124. 28	108. 43	115. 49	128. 23	269. 18	89. 69	130. 94	109. 22	235. 45	156. 39
4.	Calcium	mg/l	52.2 9	61.2 3	57.4 6	55.2 6	51.2 3	48.3 4	57.1 6	58.1 3	59.1 6	53.2 4	46.1 8	52.4 2	43.1 2	43.1 8	49.1 6	68.4	40.4 3
5.	Magnesium	mg/l	29.1 7	33.6 2	31.2 6	31.1 9	30.4 2	29.4 6	27.5 4	29.6 3	32.2 3	28.1 6	29.1 3	28.1 8	22.6 1	20.4 7	26.4 3	49.1 9	23.1 4
6.	Iron	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7.	Lead	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8.	Total Dissolved solids	mg/l	123 8	132 4	124 9	126 9	136 9	127 9	129 6	124 3	123 5	128 7	126 8	137 2	133 4	132 7	123 7	129 8	123 7
9.	Total Alkalinity	mg/l	153. 27	157. 63	146. 24	159. 37	167. 24	163. 27	163. 24	163. 61	172. 13	159. 32	156. 18	143. 18	175. 45	187. 43	184. 39	192. 25	187. 65
10.	Potassium	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

S. No	PARAMETER	UNIT	WS 1	WS 2	WS 3	WS 4	WS 5	WS 6	WS 7	WS 8	WS 9	WS 10	WS 11	WS 12	WS 13	WS 14	WS 15	WS 16	WS 17
11.	Sulphates	mg/l	0.067	0.063	0.063	0.054	0.052	0.049	0.062	0.067	0.056	0.073	0.072	0.061	0.056	0.042	0.052	0.045	0.039
12.	Chlorides	mg/l	53.24	57.89	54.18	61.25	51.24	65.23	56.26	48.23	53.24	51.24	58.24	63.18	45.19	63.67	53.16	68.45	58.18
13.	Sodium	ppm	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14.	Nitrates	mg/l	0.016	0.023	0.026	0.029	0.022	0.023	0.024	0.022	0.02	0.015	0.022	0.02	0.018	0.015	0.019	0.011	0.016
15.	Fluoride	mg/l	0.013	0.019	0.016	0.021	0.019	0.018	0.014	0.012	0.017	0.011	0.019	0.013	0.016	0.013	0.015	0.017	0.021
16.	Conductivity	µS/cm	426.39	487.62	487.62	405.14	506.22	493.21	461.31	387.26	423.96	413.26	453.12	459.23	447.12	535.21	535.64	517.14	559.37
17.	Dissolve Oxygen	mg/l	1.92	1.96	1.87	1.56	1.63	1.76	1.82	1.76	1.54	2.03	1.78	1.98	1.6	1.6	1.3	1.2	1.9
18.	Total coliform	No/100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Source: RITES Field Studies November 2020

4.2.7 AIR

All air pollutants emitted by point and non-point sources are transported, dispersed or concentrated by meteorological and topographical conditions. The meteorological parameters regulate the transport and diffusion of pollutants into the atmosphere. Meteorological data on rainfall, wind, humidity, and temperature was collected from secondary sources.

Climate: The climate of Mumbai is characterized by a humid summer and heavy south-west monsoon rainfall. In addition to these, humidity in the atmosphere exists throughout the year. The cold season from December to February is followed by the summer season from March to June. The period from June to about the end of September constitutes the south-west monsoon season and October and November form the post-monsoon season. The monthly total temperature, rainfall, relative humidity of meteorological stations Colaba and Santacruz collected from IMD and presented in From the Tables it is observed that monthly mean temperature varies from 14.7°C to 35.35°C, maximum rainfall is in the month of June and the relative humidity at Mumbai ranges between 37.2% to 139.6%.

Table 4-8: Monthly Rainfall (2012-17)

Year	JAN		FEB		MAR		APR		MAY		JUNE		JULY		AUG	
2012	0.0	0.0	0.0	0.0	0.0	0.0	177.1	393.0	520.2	340.0	127.5	0.0	0.0			
2013	0.0	0.0	0.0	0.0	0.0	0.0	954.7	874.5	234.8	307.2	66.2	6.4	0.5			
2014	0.9	7.8	0.0	0.0	0.0	0.0	55.0	1356.9	432.4	291.7	46.2	4.2	30.0			
2015	0.0	0.0	12.2	1.4	2.4	866.3	280.2	188.3	270.0	71.3	1.7	0.0				
2016	0.0	0.0	0.0	0.0	3.7	516.6	753.9	488.4	733.4	67.4	0.0	0.0				
2017	0.0	0.0	0.0	0.0	0.0	308.1	523.6	651.8	1979.5	94.4	0.0	104.8				
Santacruz																
2012	0	0	0	0	0	299	627.9	377.1	564	198	0	0				
2013	0	0	0	0	0	1030	891.1	256.3	191	85.7	0	0				
2014	0	0	0	0	0	87.3	1469	458	286	23.4	0	1.5				
2015	0	0	13	0	0	1107	359.1	153.9	204	31.3	0	0				
2016	0	0	10	0	0	697.4	926.0	561.7	756.5	78.7	0	0				
2017	0	0	0	0	3.5	523.3	5.8	55.6	603.2	83.6	0	75.8				

Source: IMD

Air Quality: The prime objective of baseline air quality survey was to assess conformity to standards of ambient air quality. To assess the baseline air quality status of the Project AoI, seventeen (17) samples were collected in the Project AOI as shown in

Figure 4.11.

Table 4-9: Monthly Temperature (OC) from 2012-17

Year	JAN		FEB		MARCH		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Colaba																								
2012	29.0	18.3	30.5	19.7	30.9	21.9	33.2	25.7	33.6	27.2	33.0	27.0	30.7	26.1	30.1	25.7	31.0	25.3	33.3	25.5	32.9	23.0	32.2	21.8
2013	29.5	19.1	30.2	21.2	32.3	23.6	32.3	24.8	34.4	27.7	30.9	25.7	28.5	25.2	30.3	25.2	30.7	25.2	32.5	25.3	33.2	23.9	31.1	21.4
2014	29.2	20.7	28.7	20.5	30.1	23.1	31.5	24.6	33.2	27.2	33.1	28.3	29.4	25.4	29.7	25.6	30.2	25.5	33.6	26.0	34.1	24.9	31.7	21.5
2015	28.8	19.9	29.8	21.2	31.5	23.5	33.2	26.1	35.0	28.4	31.3	26.4	30.7	26.6	30.0	25.9	30.7	25.7	33.6	26.8	33.8	25.3	31.4	21.7
2016	30.3	20.3	29.0	21.1	32.0	24.3	32.2	25.8	34.2	28.0	32.7	27.3	29.1	25.6	29.6	25.8	29.6	25.1	31.0	24.7	34.5	23.1	33.6	22.3
2017	30.9	20.3	31.6	21.5	31.9	23.7	33.7	26.4	34.5	28.1	32.1	26.6	30.3	25.9	30.0	25.2	31.0	25.5	32.8	25.7	33.8	23.2	30.9	21.2
Santacruz																								
2012	29.8	14.9	32.4	16.1	32.4	18.8	33.7	24.2	33.18	26.3	33.2	26.7	30.7	25.8	30.4	25.5	30.8	24.9	33.97	23.7	33.29	19.2	32.6	18.4
2013	30.7	14.7	31.4	17.4	34	19.3	33	22.2	33.76	25.8	31.2	24.4	29.4	23.7	29.9	23.9	31.1	25	32.73	24.6	34.08	21.5	32.2	19
2014	30.6	18.2	30.8	18.9	33	21.7	33.3	24.2	34.08	26.9	34	28.4	29.9	25.1	30.4	25	31.1	25.1	34.56	24.2	34.87	22	32.5	17.9
2015	30.2	16.2	32.3	17.6	33.5	20.7	33.2	24	34.59	26.9	32.2	25.9	31.6	26.2	31.1	25.1	31.9	24.1	35.35	24.5	35.29	21.7	33.1	16.7

Year	JAN		FEB		MARCH		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	Colaba																							
2016	31.7	16.2	30.8	18.3	33.8	22.1	33.7	24.2	34.3	27.3	32.9	26.7	29.7	24.3	29.9	24.9	30.0	23.9	32.2	22.5	34.9	18.7	33.9	17.8
2017	31.9	16.4	33.3	18.0	33.1	20.5	33.7	23.7	34.1	26.3	32.8	26.1	30.8	25.0	30.5	25.1	31.5	25.6	33.6	25.0	34.1	20.8	31.1	18.2

Source: IMD

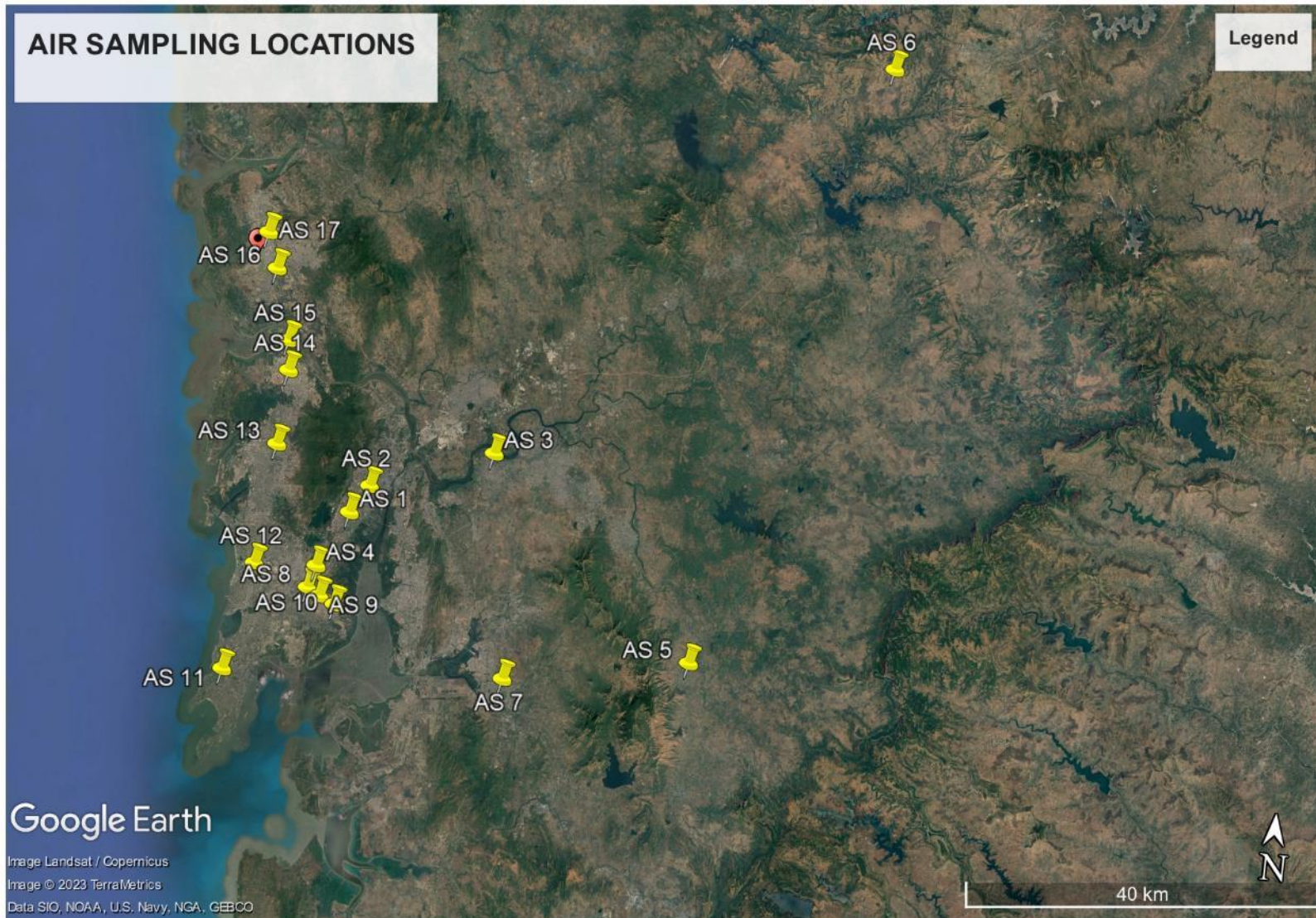
Table 4-10: Relative Humidity from 2012-17

Year	JAN		FEB		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPT		OCT		NOV		DEC	
	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30	8:30	17:30
	Colaba																							
2012	73.8	59.3	75.2	58.9	81.5	62.1	82.3	72.7	80.5	71.5	85.8	77.0	90.4	86.4	92.0	86.4	91.2	81.5	85.5	68.1	79.7	63.1	82.6	63.6
2013	84.2	60.7	79.4	66.2	81.2	60.2	83.9	71.6	80.2	69.9	90.6	84.6	94.6	90.8	92.5	81.8	94.5	83.7	90.9	80.6	82.8	69.9	82.4	63.9
2014	81.3	67.6	81.0	64.3	79.4	65.8	88.1	76.4	86.9	74.0	88.5	79.9	96.6	91.6	96.9	89.4	95.9	87.4	88.8	76.3	84.2	69.7	67.9	55.6
2015	73.7	58.3	78.7	64.1	73.5	63.8	81.1	69.7	81.6	72.8	86.0	83.1	88.2	83.0	-	-	-	-	-	-	-	-	-	-
2016	78.5	66.8	83.6	124.6	80.4	68.4	81.7	126.1	80.1	75.3	82.8	132.4	95.0	91.1	92.1	115.0	92.6	139.6	86.0	82.5	78.5	130.4	79.8	76.3

20	81.	71.	78.	72.	82.	72.	80.	73.	79.	76.	84.	81.	85.	82.	87.	82.	90.	85.	88.	81.	80.	69.	82.	74.
17	6	2	5	1	9	7	8	9	8	1	7	4	8	0	1	4	1	1	7	5	1	9	8	3
Santacruz																								
20	75.	46.	73.	37.	74.	45.	71.	58.	69.	64.	76.	70.	85.	81.	86.	78.	85.	74.	73.	60.	72.	52.	72.	53.
12	2	2	7	2	2	0	3	9	1	2	2	1	8	7	0	6	8	6	1	3	3	9	1	7
20	84.	46.	84.	48.	71.	43.	70.	60.	68.	63.	83.	80.	87.	114	85.	77.	85.	75.	80.	69.	69.	55.	69.	50.
13	0	2	4	4	7	1	5	5	9	9	5	4	8	.5	8	7	4	5	9	3	1	7	0	8
20	74.	52.	74.	50.	68.	51.	72.	59.	71.	63.	73.	68.	88.	84.	88.	80.	86.	75.	76.	90.	72.	56.	63.	48.
14	9	7	3	1	7	5	0	1	1	7	6	4	5	4	1	3	7	5	7	1	3	2	8	6
20	76.	50.	80.	49.	71.	55.	72.	64.	70.	64.	79.	75.	78.	75.	84.	74.	84.	71.	75.	64.	67.	50.	67.	43.
15	0	8	3	0	3	6	4	6	7	9	9	0	9	1	4	9	1	0	0	4	2	9	5	1
20	75.	43.	82.	50.	75.	49.	71.	54.	70.	64.	78.	72.	89.	84.	85.	80.	85.	78.	78.	67.	58.	47.	66.	48.
16	3	0	4	4	3	0	5	6	4	8	0	7	1	0	2	0	9	2	6	8	5	4	7	3
20	75.	46.	73.	42.	74.	49.	71.	112	70.	65.	79.	127	85.	80.	85.	80.	86.	75.	80.	68.	63.	101	76.	60.
17	1	4	8	3	5	2	8	.5	9	4	9	.3	0	8	5	0	3	9	1	8	9	.3	9	1

Source: IMD

Figure 4.11 Air Quality Monitoring Locations



Five major air pollutants viz. particulate matter (PM₁₀ & PM_{2.5}), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂) and Carbon Monoxide (CO) were monitored. The monitoring was carried out twice a week for 1 month by collecting 24 hourly samples continuously for 2 days. Results of the monitoring are tabulated in **Table 4-11**. From the monitoring results, all parameters are within the permissible limits as specified National Ambient Air Quality Standards for residential, rural & other areas these parameters were compared with IFC standards and it was observed that PM₁₀ and PM_{2.5} are exceeding the permissible limits at all locations. Road-suspended dust and vehicle emissions are the major sources of pollution.

Table 4-11: Air Sample Analysis Results

S. No.	Sample ID	Location	Date	Concentration				
				PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
Permissible Limit				100	60	80	80	2
Unit				µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³
1.	AS1	Bhandup	24.11.2020	84.91	42.12	13.25	6.4	<1.0
			27.11.2020	88.72	40.04	12.24	5.7	<1.0
			01.12.2020	87.29	43.6	13.4	6.3	<1.0
			04.12.2020	87.39	44.18	16.04	6.1	<1.0
			08.12.2020	81.25	46.32	16.23	6.08	<1.0
			10.12.2020	85.11	41.39	11.17	5.87	<1.0
			15.12.2020	84.29	44.18	13.19	5.72	<1.0
			17.12.2020	86.53	43.05	11.23	8.13	<1.0
2.	AS2	Mulund	23.11.2020	86.23	43.10	17.27	10.43	<1.0
			26.11.2020	81.45	45.61	19.08	12.19	<1.0
			30.11.2020	80.29	44.42	17.57	12.82	<1.0
			03.12.2020	88.29	46.92	18.38	14.66	<1.0
			07.12.2020	82.53	44.51	20.45	17.24	<1.0
			10.12.2020	82.42	41.27	20.14	16.28	<1.0
			14.12.2020	80.69	43.81	18.46	13.34	<1.0
			17.12.2020	82.38	43.45	18.22	12.67	<1.0
3.	AS3	Dombivli	23.11.2020	88.4	44.2	11.3	3.1	<1.0
			26.11.2020	83.47	41.17	14.63	7.1	<1.0
			30.11.2020	88.14	49.23	11.49	5.07	<1.0
			03.12.2020	82.24	44.36	15.29	6.8	<1.0
			07.12.2020	87.21	42.47	14.26	7.89	<1.0
			10.12.2020	83.42	40.08	12.35	7.27	<1.0
			14.12.2020	82.24	43.30	15.27	7.03	<1.0
			17.12.2020	85.23	42.19	14.21	6.8	<1.0
4.	AS4	Ghatkopar	24.11.2020	83.22	47.08	15.61	8.94	<1.0
			27.11.2020	86.28	46.41	18.37	9.47	<1.0
			01.12.2020	85.42	46.58	17.29	8.72	<1.0
			04.12.2020	85.08	47.27	18.14	10.05	<1.0
			08.12.2020	84.58	44.65	19.23	10.07	<1.0
			10.12.2020	88.07	43.13	17.29	9.24	<1.0

S. No.	Sample ID	Location	Date	Concentration				
				PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
Permissible Limit				100	60	80	80	2
Unit				µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³
5.	AS5	Neral	15.12.2020	83.27	44.20	15.06	9.63	<1.0
			17.12.2020	85.47	47.31	16.24	8.01	<1.0
			23.11.2020	69.41	46.08	16.43	10.17	<1.0
			26.11.2020	74.68	44.31	13.40	8.44	<1.0
			30.11.2020	72.43	45.81	17.06	10.22	<1.0
			03.12.2020	73.57	43.60	19.42	11.35	<1.0
			07.12.2020	75.10	44.72	18.51	14.06	<1.0
			10.12.2020	71.08	42.49	17.04	13.52	<1.0
			14.12.2020	76.12	47.19	19.65	12.16	<1.0
6.	AS6	Kasara	17.12.2020	73.97	45.06	18.33	13.24	<1.0
			23.11.2020	50.43	23.12	11.43	8.70	<1.0
			26.11.2020	54.43	21.32	14.93	9.47	<1.0
			30.11.2020	52.12	23.41	11.67	7.42	<1.0
			03.12.2020	54.14	21.44	13.69	8.24	<1.0
			07.12.2020	53.96	24.61	15.29	9.46	<1.0
			10.12.2020	50.03	21.27	16.43	9.04	<1.0
			14.12.2020	51.26	22.18	15.09	9.64	<1.0
7.	AS7	GTB Nagar	17.12.2020	49.23	24.03	14.73	9.27	<1.0
			24.11.2020	84.21	42.17	11.36	6.12	<1.0
			27.11.2020	81.17	40.65	15.19	8.32	<1.0
			01.12.2020	85.43	41.24	17.63	9.06	<1.0
			04.12.2020	82.04	43.56	15.27	10.13	<1.0
			08.12.2020	86.26	44.09	16.13	9.47	<1.0
			10.12.2020	81.23	49.17	14.08	10.19	<1.0
			15.12.2020	88.24	50.09	15.76	13.97	<1.0
8.	AS8	Chembur	17.12.2020	86.62	56.02	14.73	11.45	<1.0
			24.11.2020	83.41	40.09	10.33	5.26	<1.0
			27.11.2020	85.43	47.19	14.32	7.09	<1.0
			01.12.2020	84.39	41.64	12.47	7.06	<1.0
			04.12.2020	85.27	42.13	14.68	7.2	<1.0
			08.12.2020	87.61	41.78	13.58	7.1	<1.0
			10.12.2020	87.32	44.29	14.05	7.69	<1.0
			15.12.2020	86.49	41.60	15.11	7.03	<1.0
9.	AS9	Govandi	17.12.2020	89.24	48.39	11.26	8.2	<1.0
			24.11.2020	87.24	42.08	13.16	10.43	<1.0
			27.11.2020	86.21	40.74	15.39	10.04	<1.0
			01.12.2020	84.15	43.26	16.54	10.06	<1.0
			04.12.2020	81.29	44.24	14.61	10.09	<1.0
			08.12.2020	85.27	44.16	16.43	9.43	<1.0
			10.12.2020	81.04	46.21	13.37	11.04	<1.0
15.12.2020	84.18	40.09	17.11	9.34	<1.0			

S. No.	Sample ID	Location	Date	Concentration				
				PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
Permissible Limit				100	60	80	80	2
Unit				µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³
			17.12.2020	88.28	42.12	15.43	13.24	<1.0
10.	AS10	Mankhurd	23.11.2020	84.43	42.31	13.27	8.96	<1.0
			26.11.2020	80.90	41.75	14.62	9.36	<1.0
			30.11.2020	83.89	52.64	12.81	9.59	<1.0
			03.12.2020	80.84	43.25	15.20	9.07	<1.0
			07.12.2020	84.69	43.18	12.09	10.23	<1.0
			10.12.2020	81.28	40.19	16.07	12.33	<1.0
			14.12.2020	84.27	43.51	15.08	11.54	<1.0
			17.12.2020	80.62	41.52	14.43	10.08	<1.0
11.	AS11	Mumbai Central (Local)	24.11.2020	86.42	43.08	14.19	8.43	<1.0
			27.11.2020	84.39	41.77	16.01	10.64	<1.0
			01.12.2020	80.50	49.08	18.47	11.42	<1.0
			04.12.2020	84.13	43.74	15.12	14.49	<1.0
			08.12.2020	87.04	45.29	16.33	13.75	<1.0
			10.12.2020	82.23	47.37	17.52	15.04	<1.0
			15.12.2020	81.07	46.88	15.31	13.01	<1.0
			17.12.2020	86.94	49.51	16.36	13.01	<1.0
12.	AS12	Santacruz	22.11.2020	79.86	46.32	19.27	10.40	<1.0
			25.11.2020	71.94	48.32	17.29	13.22	<1.0
			29.11.2020	74.19	47.73	19.41	12.57	<1.0
			02.12.2020	76.77	45.90	18.61	13.07	<1.0
			06.12.2020	71.08	44.82	19.11	12.15	<1.0
			09.12.2020	73.48	48.30	18.44	11.08	<1.0
			13.12.2020	74.14	46.19	20.82	13.71	<1.0
			16.12.2020	70.37	44.11	18.43	10.50	<1.0
13.	AS13	Kandivali	22.11.2020	80.26	42.17	11.53	6.92	<1.0
			25.11.2020	82.68	44.06	12.46	8.13	<1.0
			29.11.2020	81.43	40.09	13.47	9.14	<1.0
			02.12.2020	84.27	41.51	15.36	10.07	<1.0
			06.12.2020	80.60	44.19	16.45	11.09	<1.0
			09.12.2020	81.49	42.17	15.32	12.65	<1.0
			13.12.2020	85.12	43.49	14.56	11.21	<1.0
			16.12.2020	82.94	44.29	15.46	12.22	<1.0
14.	AS14	Mira Road	22.11.2020	77.19	43.65	22.42	10.26	<1.0
			25.11.2020	79.22	51.54	20.38	12.51	<1.0
			29.11.2020	76.63	44.14	21.27	13.50	<1.0
			02.12.2020	76.30	42.21	22.71	14.56	<1.0
			06.12.2020	73.11	41.22	24.23	16.47	<1.0
			09.12.2020	71.08	40.14	22.67	19.40	<1.0
			13.12.2020	73.12	43.24	23.11	17.39	<1.0
			16.12.2020	65.93	32.41	24.19	19.10	<1.0

S. No.	Sample ID	Location	Date	Concentration				
				PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO
Permissible Limit				100	60	80	80	2
Unit				µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³
15.	AS15	Bhayandar	22.11.2020	85.27	83.12	13.09	6.18	<1.0
			25.11.2020	80.16	40.23	17.06	7.17	<1.0
			29.11.2020	81.27	41.63	13.76	7.41	<1.0
			02.12.2020	86.02	43.13	14.92	8.07	<1.0
			06.12.2020	80.22	44.71	15.39	8.03	<1.0
			09.12.2020	85.47	42.34	11.28	7.03	<1.0
			13.12.2020	81.97	43.52	11.63	6.08	<1.0
			16.12.2020	83.28	44.17	14.08	7.32	<1.0
16.	AS16	Vasai Road	22.11.2020	86.41	46.85	11.3	3.1	<1.0
			25.11.2020	80.09	43.37	17.1	10.51	<1.0
			29.11.2020	83.29	47.20	19.06	11.52	<1.0
			02.12.2020	80.19	48.78	20.53	12.22	<1.0
			06.12.2020	81.63	45.08	21.10	11.60	<1.0
			09.12.2020	84.05	47.24	20.69	12.56	<1.0
			13.12.2020	82.11	45.23	19.37	13.49	<1.0
			16.12.2020	80.42	40.10	18.54	12.18	<1.0
17.	AS17	Nalla Sopara	22.11.2020	78.06	47.69	14.17	8.94	<1.0
			25.11.2020	77.12	49.48	16.50	10.62	<1.0
			29.11.2020	76.42	51.30	18.16	11.04	<1.0
			02.12.2020	74.15	52.63	19.06	13.72	<1.0
			06.12.2020	71.76	50.40	17.92	14.27	<1.0
			09.12.2020	74.49	52.01	16.52	13.15	<1.0
			13.12.2020	70.85	46.21	18.27	15.62	<1.0
			16.12.2020	77.02	44.76	16.42	13.09	<1.0

Source: RITES Field Studies November and December 2020

4.2.8 NOISE

Noise exposure can lead to adverse effects on health. The impacts of noise sources on surrounding community depend upon:

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

Noise level monitoring was conducted at 17 locations in the Project AoI with an objective to establish the baseline noise levels and assess the impacts of the noise expected due to the

proposed development. Noise levels were recorded on hourly basis for 24 hours continuously in order to have an assessment of the Day and Nighttime noise levels. The sample locations are shown in **Figure 4.12** and the noise levels so obtained are summarized in **Table 4-12**. It is observed from the table that L_{eq} for day and night at all monitoring locations were exceeding the permissible limits for commercial zone as per National Ambient Noise Standards. The main source of noise in the Project AoI is the traffic movement on the road.

Figure 4.12 Noise Quality Monitoring Locations

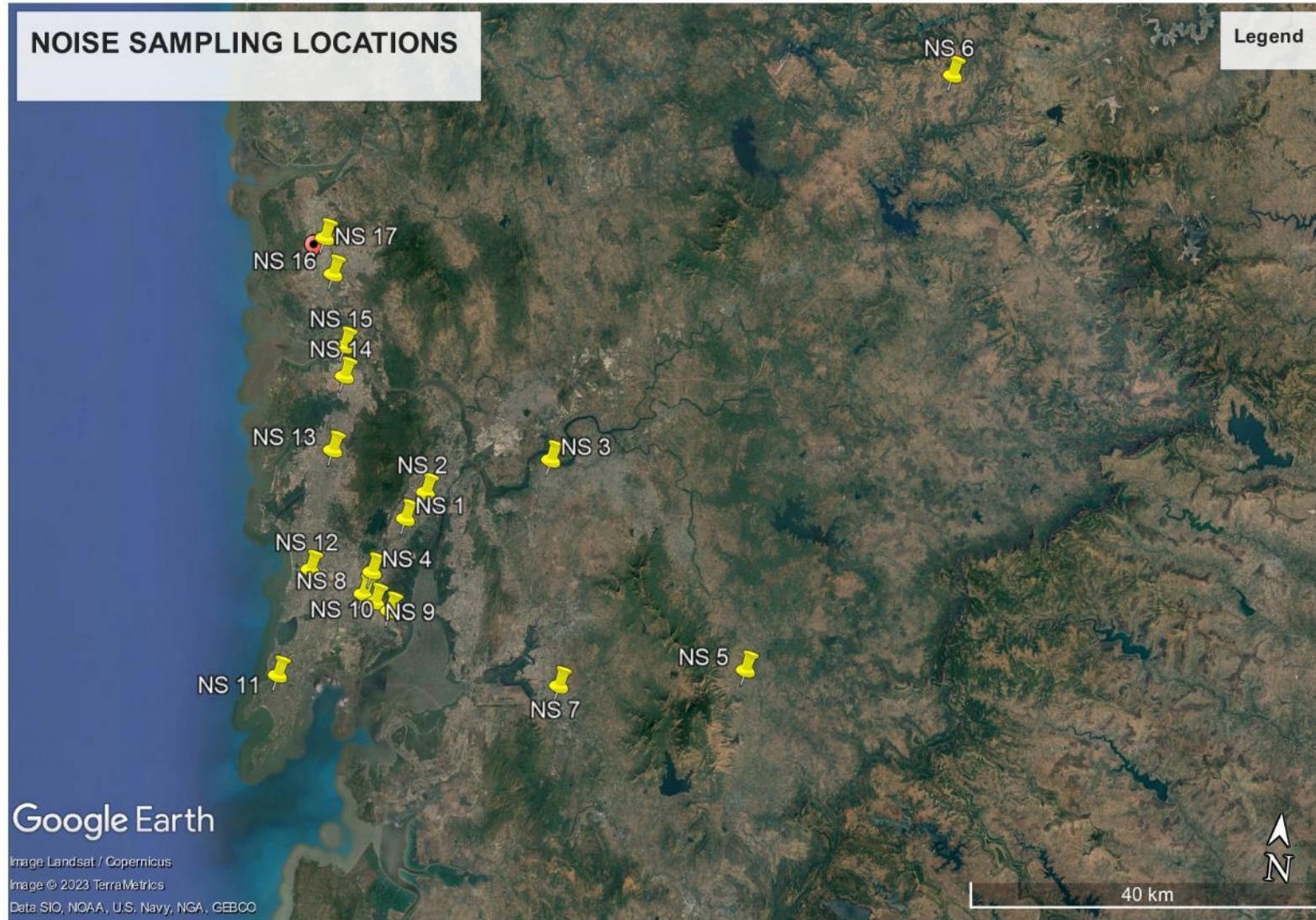


Table 4-12: Noise Sample Analysis Results

S.No	Sample Code	Location	Date of Monitoring	Lmin	Lmax	L10	L50	L90	Lday	Lnigt	Ldn	Leq
1.	NS1	Bhandup	24.11.2020	53	71	70	59	51	70	64	67	68
2.	NS2	Mulund	23.11.2020	53	71	69	55	54	71	65	66	66
3.	NS3	Dombivli	23.11.2020	53	71	70	57	54	73	60	69	66
4.	NS4	Ghatkopar	24.11.2020	53	71	72	55	54	70	66	64	66
5.	NS5	Neral	23.11.2020	49	70	69	55	50	71	62	65	65
6.	NS6	Kasara	23.11.2020	53	73	73	60	55	74	64	68	69
7.	NS7	GTB Nagar	24.11.2020	53	72	70	56	53	71	65	66	68
8.	NS8	Chembur	24.11.2020	53	71	70	56	53	71	65	66	66
9.	NS9	Govandi	24.11.2020	53	70	73	55	50	74	61	69	66
10.	NS10	Mankhurd	23.11.2020	52	70	73	68	55	70	61	67	66
11.	NS11	Mumbai Central (Local)	24.11.2020	55	72	73	56	55	70	60	67	66
12.	NS12	Santacruz	22.11.2020	50	70	70	57	50	71	64	66	66
13.	NS13	Kandivali	22.11.2020	52	70	69	55	50	71	64	66	65
14.	NS14	Mira Road	22.11.2020	52	70	69	55	50	71	65	62	66
15.	NS15	Bhayandar	22.11.2020	53	71	70	57	53	70	65	66	69
16.	NS16	Vasai Road	22.11.2020	53	71	68	55	50	70	62	67	66
17.	NS17	Nalla Sopara	22.11.2020	52	70	69	57	53	70	61	69	65

Source: RITES Field Studies November 2020

4.2.9 VIBRATION

Human response to vibration is subjective and will be different for different people. When the vibrations reach the floors and walls it may result in perceptible vibration depending on the amplitude and frequency of the vibrations. Rattling of windows, dishes, and similar parts may also result in audible noise which is called ground-borne noise. People may be more annoyed if they are exposed to both noise and vibration compared to when only vibration is felt.

Ground-borne vibration can be a major concern for nearby neighbours of a transit system route or maintenance facility. Some common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving and operating heavy earth-moving equipment.

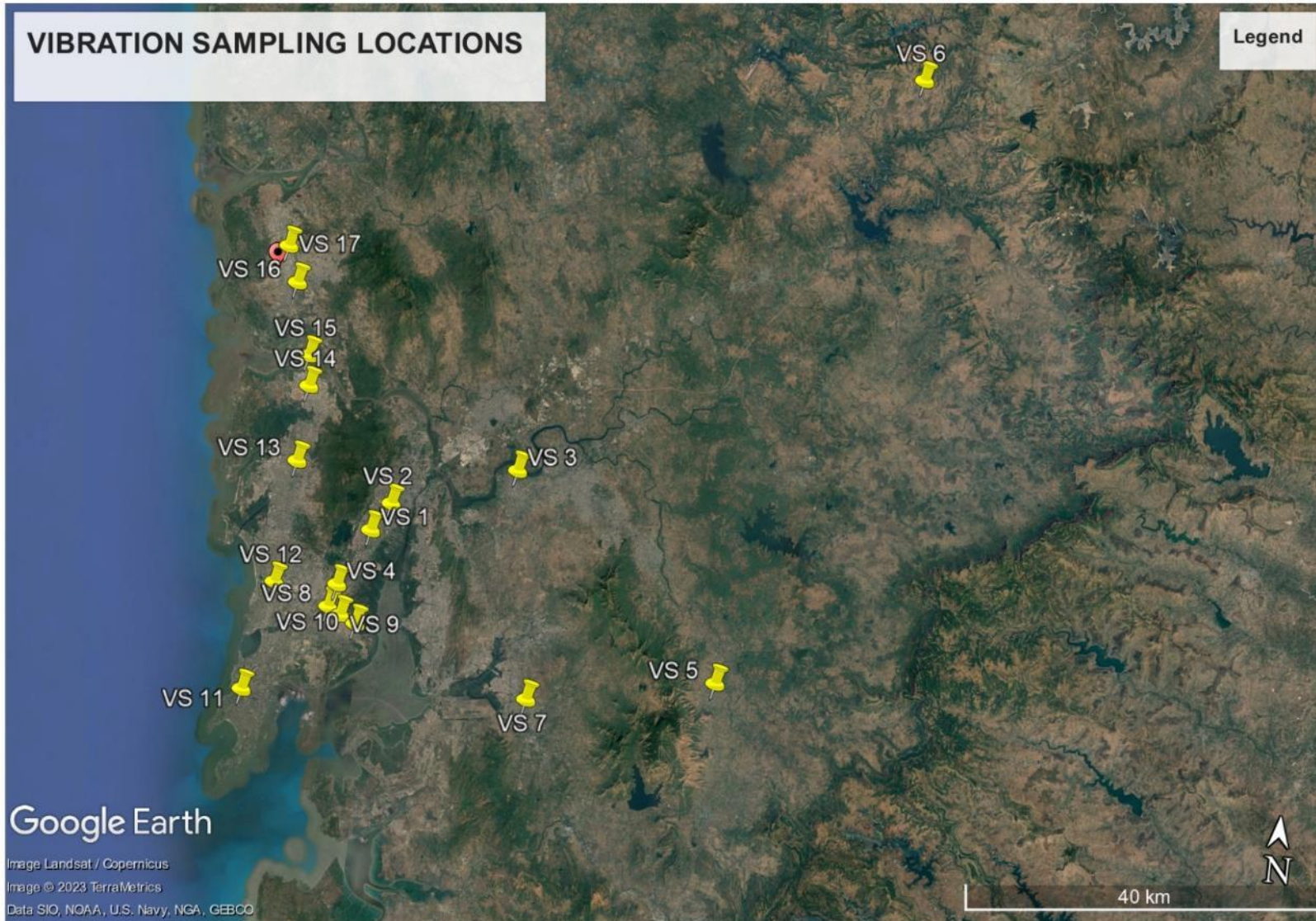
Vibration monitoring was carried out at 17 locations as indicated in **Figure 4.13**. Vibration monitoring was conducted for 24 hr at each location. Vibration meter recorded all three-direction vibration (Radial, Vertical and Horizontal vibration) per minute in VdB and in mm/s. Peak Particle Vibration was calculated from the recorded vibration. The list of location along with the date of monitoring is given in **Table 4-13**. Vibration monitoring was carried out using the Nomis Seismograph equipment which can measure the radial, transverse, and vertical vibration of ground-borne vibrations.

Table 4-13: Vibration Sample Analysis Results

Sr No	Sample Code	Location	Date of Monitoring	VdB(mm/sec.)	
				Maximum	Minimum
1.	VS1	Bhandup	14.12.2020 to 15.12.2020	1.2464	0.3810
2.	VS2	Mulund	12.12.2020 to 13.12.2020	0.8128	0.3048
3.	VS3	Dombivli	13.12.2020 to 14.12.2020	0.9398	0.4064
4.	VS4	Ghatkopar	15.12.2020 to 16.12.2020	0.9398	0.3073
5.	VS5	Neral	11.12.2020 to 12.12.2020	1.778	0.3810
6.	VS6	Kasara	11.12.2020 to 12.12.2020	0.4318	0.3048
7.	VS7	GTB Nagar	08.12.2020 to 09.12.2020	1.8034	0.4064
8.	VS8	Chembur	09.12.2020 to 10.12.2020	1.1176	0.3810
9.	VS9	Govandi	09.12.2020 to 10.12.2020	1.0668	0.3810
10.	VS10	Mankhurd	10.12.2020 to 11.12.2020	0.4572	0.3810
11.	VS11	Mumbai Central (Local)	04.12.2020 to 05.12.2020	1.0922	0.4826
12.	VS12	Santacruz	04.12.2020 to 05.12.2020	0.5334	0.3810
13.	VS13	Kandivali	05.12.2020 to 06.12.2020	0.4572	0.3048
14.	VS14	Mira Road	07.12.2020 to 08.12.2020	3.4798	1.6510
15.	VS15	Bhayandar	06.12.2020 to 07.12.2020	1.4478	0.3073
16.	VS16	Vasai Road	06.12.2020 to 07.12.2020	0.8382	0.4572
17.	VS17	Nalla Sopara	05.12.2020 to 06.12.2020	1.0668	0.4064

Source: RITES Field Studies December 2020

Figure 4.13 Vibration Monitoring Locations



4.3 Biological Environment

An ecological study has been conducted in Project Aol in the month October 2020-December 2021. Primary data has been collected through field survey of 17 stations out of 17 identified stations proposed for the development. Site reconnaissance was done during 1st to 5th October 2020 followed by the detailed study from 17th to 27th November 2020 and 21st to 27th December 2021. Random observation method used for sampling flora and fauna of Mumbai using pictorial handbooks of BNHS. Secondary data from Mumbai Metropolitan Region Biodiversity Report, 2011 has also been referred.

4.3.1 FLORA

For enumeration and quantification of plant biodiversity, in-depth study has been done in the Project Aol. Field studies were carried out to gather authentic information on enumeration, quantification in the project Aol. Techniques of random observation and station wise tree census were followed for data collection. Total number of trees impacted due to proposed development activity at identified 17 stations is 254. The station wise inventory of affected trees due to proposed development is given in **Table 4-14**.

Table 4-14: Inventory of Impacted Trees due to Proposed Development

Sr. No.	Stations Name	Number of Tree
1	Mumbai Central station	4
2	Kandivali station	25
3	Nalla Sopara station	0
4	Mulund station	46
5	Bhandup station	7
6	GTB Nagar station	5
7	Chembur station	3
8	Govandi station	8
9	Mankhurd station	12
10	Neral station	122
11	Kasara station	2
12	Dombivli station	10
13	Vasai station	0
14	Bhayandar station	1
15	Mira road station	7
16	Ghatkopar station	2
17	Santacruz station	0
Total		254

Source: RITES Field Study October 2020-December 2021.

It can be seen from the table that maximum number of trees impacted are 122 at Neral station followed by 46 at Mulund Station. These two are the only stations where maximum trees are getting impacted. There are 14 stations where number of trees impacted lie between 0-15 trees. The details of impacted tree are given in **Annexure 4.1**. The common &

local names of the flora are given in **Annexure 4.2**. The site photographs of the Neral station with maximum trees impacted are shown in

Figure 4.14. Most of the impacted trees are exotic species and very few are native tree species. As per ecological studies no Rare, Endangered, Endemic & Threatened species are present in the Project Aol.

Figure 4.14: Photograph of Trees Impacted at Neral Station





4.3.2 FAUNA

For sampling and monitoring the vertebrates from the Project Aol of 17 identified station, the standard methodologies were followed as given in the “Handbook of Biodiversity methods Survey, Evolution and Monitoring” (Hill et al. 2005) and “Practical Methods in Ecology” (Henderson 2003).

Fauna observed in Project Aol of 17 identified station locations: The faunal survey has been conducted in Project Aol of 17 identified Stations. The species were identified with visual observations and vocal sounds. The pond heron has been observed at surface water pond in the Project Aol of the Mankhurd station as shown in **Figure 4.15**. The kingfisher, common pigeon and pair of common pigs were observed in the Project Aol of Kasara station as shown in **Figure 4.16**. The standard field guides were referred for proper identification of the species. (Daniel 2002; Daniels 2002; Prater 2005; Manakadan et al. 2012). Rare, Endangered, Endemic and Threatened (REET) species as classified by International Union for Conservation of Nature (IUCN) are not observed in Project Aol.

Figure 4.15 Avifauna (Birds) observed near Mankhurd Station



Figure 4.16 Avifauna (Birds) and Mammalian Fauna observed near Kasara Station



4.3.3 ECOLOGICALLY SENSITIVE (NATURAL RESERVE) SITES IN EXTENDED IDENTIFIED INFLUENCE AREA

Two ecologically sensitive sites were found within the extended influence area of 10 km of 17 identified proposed Stations i.e. Thane Creek Flamingo Sanctuary (TCFS) and Sanjay Gandhi National Park (SGNP). Locations of eco-sensitive sites are shown in **Figure 4.17**. TCFS is dedicated for flamingos and SGNP is important for Mammalian fauna, Avifauna and Herpato fauna.

A. Thane Creek Flamingo Sanctuary

The Maharashtra Government has declared the area along the western bank of the Thane Creek as the “Thane Creek Flamingo Sanctuary” (TCFS). The sanctuary was notified in Maharashtra Govt. Gazette on 10 May 2018. The 1,690.525 hectares sanctuary includes 794 hectares of creek area and is located on the western bank, between the Airoli and Vashi bridges that connect Mumbai with Navi Mumbai.

The MoEFCC issued draft notification dated 8th April 2021 has an area of 16.90 square kilometers. The Eco-sensitive Zone shall be to an extent of 0 (zero) to 3.89 kilometres around the boundary of Thane Creek Flamingo Sanctuary and the area of the Eco-sensitive Zone is 48.32 sq. km.

The region of the Thane Creek has been recognized as an Important Bird Area by the Bombay Natural History Society (BNHS), as it is home to various avian species. It harbours populations of flamingos and several other migratory and wading birds. The flamingo sanctuary is spread on the western side of Thane creek across Mulund (143 ha), Bhandup (95 ha), Kanjurmarg (265 ha), Vikhroli (257 ha) and Mandale (31 ha). The ‘Mumbai Mangrove Conservation Unit’ under the Mangrove Cell is responsible for the management of the sanctuary. The sanctuary hosts nearly 40,000 flamingos for almost six months every year, including the Greater and Lesser flamingos. Besides flamingos, the creek is the wintering refuge for many species of migratory birds, including large number of Pied Avocets, Black-tailed Godwits, Common Redshanks, stints, and sand plovers. Out of 17 identified proposed stations the list of stations with in 10 km proximity of TCFS is given in **Table 4-15**.

Figure 4.17 Map Showing Ecologically Sensitive Sites within 10 km of 17 Identified Stations



Table 4-15: The List of Station 10 km Proximity of TCFS

S no	Name of station	Nearest distance from TCFS in KM
1.	Mankhurd station	0.6
2.	Bhandup station	1.5
3.	Govandi station	2.31
4.	Mulund station	2.44
5.	Chembur station	3.57
6.	Ghatkopar station	4.32
7.	GTB Nagar station	8.03

B. Sanjay Gandhi National Park

As per Notification 5th December 2016; Eco-sensitive Zone is spread over an area of 59.456 sq. km to an extent of 100 meters to 04 kilometres from the boundary of Sanjay Gandhi National Park (SGNP). The vegetation in area ranges from littoral forests to western sub-tropical hill forests. The Park has Southern Tropical Moist Mixed Deciduous Forest and Western Sub Tropical Hill Forest (revised classification of Indian Forest Types by Champion and Seth). Out of 17 identified proposed stations the list of stations with in 10 km proximity of SGNP is given in **Table 4-16**. However, no stations fall under ESZ of SGNP.

Table 4-16: The List of Station 10 km Proximity of SGNP

S no	Name of station	Nearest distance from SGNP in KM
1.	Bhandup station	1.60
2.	Mulund station	2.27
3.	Mira road station	3.09
4.	Kandivali station	3.42
5.	Bhayandar station	4.70
6.	Santacruz station	8.32

4.4 Cultural Resources

Cultural resources identified within Project AoI are given in **Table 4-17** and these cultural resources are marked on Satellite Images as shown in **Annexure 4.3**. Each identified cultural resource has been assigned a Unique Identification Number (UIN) and photographs of each cultural resource are shown in **Annexure 4.4**.

Table 4-17: Cultural Resources in Project AoI

S. No	Railway Station Name	Category	E & S Profile	UIN
1.	Bhandup	Religious Place	Mahadev Mandir	1630
2.		Religious Place	Krishna Mandir	1637
3.	Bhayandar	Religious Place	Shani Mandir	1260
4.		Religious Place	Jain Mandir	1311
5.		Religious Place	Nageshwar Mahadev Shani Mandir	1596

S. No	Railway Station Name	Category	E & S Profile	UIN
6.	Chembur	Religious Place	Mandir	1619
7.	Dombivli	Religious Place	Shree Ram Mandir	1118
8.		Religious Place	Mandir	1650
9.	Govandi	Religious Place	Shree Gavdevi Mandir	978
10.	GTB Nagar	Religious Place	Lord Ganesh Mandir	2
11.		Religious Place	Maa Durga Devi Mandir	8
12.		Religious Place	Mariamman Mandir	26
13.		Religious Place	Zion Christian Assembly - Church	600
14.		Religious Place	Gurudwara	1085
15.	Kandivali	Religious Place	Mandir	591
16.		Religious Place	Sai Mandir	595
17.	Kasara	Religious Place	Maruti Mandir	30
18.		Religious Place	Shri Siddheshwar Mandir	517
19.		Religious Place	Mandir	654
20.		Religious Place	Shri Sheetla Devi Mandir	1659
21.		Religious Place	Hanumanji Mandir	1660
22.	Mankhurd	Religious Place	Masjid	357
23.	Mira Road	-	-	-
24.	Mulund	Religious Place	Ganesh Mandir	188
25.		Religious Place	Maruti Mandir	1112
26.		Religious Place	Shri Swaminarayan Mandir	1121
27.		Religious Place	Mukteshwar Mahadev Mandir	1639
28.		Religious Place	Mandir	1642
29.	Mumbai Central	Religious Place	Yasho Mandir	585
30.	Nalla Sopara	Religious Place	Gogate Ganpati Mandir	190
31.	Neral	Religious Place	Dawood Bohra Masjid	981
32.	Santacruz	Religious place	Revival Ag Church & Ministries	444
33.		Religious Place	Sunni Masjid	874
34.		Religious Place	Hari Masjid	1136
35.		Religious Place	Al Masjid-UI Ezzi - Dawood Bohra Masjid	1615
36.	Vasai Road	Religious Place	Al Noor Masjid	48
37.		Religious Place	Shri Shiv Sai Mandir	1578
38.		Religious Place	Masjid	1585
39.	Ghatkopar	-	-	-

4.5 Socio-Economic

4.5.1 PROFILE OF PROJECT INFLUENCED AREA

Total 17 stations were surveyed for suburban railway stations of Mumbai. After several alterations and rounds of scrutiny from MRVC division it was observed that total nine structures (18 PAPs) who are encroachers will likely be affected, i.e; at Chembur and Mumbai Central stations. At Chembur, only five commercial non-titleholders, and at Mumbai Central, four residential non-titleholders will likely be affected due to the proposed development and accordingly compensation and R&R shall be prepared and provided to affected families. The data collected through census & socio-economic survey generated demographic and socio-economic profile of people in project influenced area. The data has been compiled and presented in tabular forms and charts.

This report will further describe the socio-economic details for Chembur station and Mumbai Central station only as the impact is been observed at this station only. In order to minimise the resettlement and social impact, MRVC division altered their plans and designs respectively.

4.5.2 DEMOGRAPHIC CHARACTERISTICS

A. Gender Distribution

The data on gender and sex ratio is very helpful indicator to know the participatory share of male and female in the society, which is also an important indicator for human development index. Based on the initial survey findings, it was observed that among the surveyed family members, 68.89% were male and remaining 31.10% were female. However, now that the project's AoI has been minimised and its impact has been reduced, the survey findings reveal that among the survey family members, 55.56% are female, whereas 44.44% are male.

B. Age Group

The persons of surveyed families have been categorized into five age groups. The initial survey findings shows that the 4.1% persons comes under the age group of below 14 years, 2.1% persons belonged to the age group between 15-18 years, 38.5% persons falls under the age group between 19 to 35 years, 46.1% persons comes under the age group between 36-59 years and 9.2% persons belonged to age group of above 60 years.

The changes were made in the design to avoid private land acquisition and involuntary resettlement. After changes being made, the AoI has been minimised and impact has been reduced. As per the survey findings, 33.33% persons falling under the age group 0-14 years, 16.67% persons coming under the age group between 19-35 years, 16.67% persons coming under the age group between 36-59 years and 33.33% persons falling under the age group above 60 years.

C. Marital Status

The marital status of the surveyed family member are indicated in four categories: married, unmarried, divorced, and widowed. As per the initial survey findings, 85.21% of respondents were married, whereas 11.53% were unmarried. The remaining 3.26% of affected persons were widow, and no divorcee was reported during the census & socio-economic survey.

After changes, out of the total surveyed family population, 66.67% was reported in the category of married and widowed population. Out of this category, 83.33% of PAPs were reported married, and the remaining 16.67% were reported widowed.

4.5.3 SOCIO-ECONOMIC PROFILE OF AFFECTED FAMILIES

A. Religious and Social Groups

Data on religious groups was collected through the census & socio-economic survey to identify people with specific religious beliefs among the surveyed families. The religious beliefs and social affiliations of the people are indicators that help to understand the cultural behaviour of the groups. The initial findings of the survey reveal that there were three religions practised in the surveyed families viz., Hindu, Muslim, and Jain. The study findings show that about 75.5% of families were Hindu, followed by 24.2% Muslims, and the remaining 0.3% belonged to the Jain religion.

The social affiliation of the group differentiates them for benefits under government schemes. Social groups indicate status within the society, preferences, and vulnerability. The families belonging to Scheduled Castes (SCs) and Scheduled Tribes (STs) falls under the provisions of Constitution of India and get preferential treatment in the government benefits because the group includes the people who are traditionally vulnerable.

Except general category, all other groups needed attention and to be addressed for their backward socio-economic conditions. The survey findings show the dominance of general category population with 65.01% families followed by 31.48% OBC families and remaining 2% families were Scheduled Tribe and Scheduled Castes respectively. Both Scheduled Castes and Scheduled Tribes families are found in the project affected area (PAA).

As per the changes being made in the project design, the latest survey findings reveal that the majority of the families follow Hinduism (88.89%) and the remaining 11.11% follow Jainism. All the surveyed PAFs fall under the general category.

B. Family Pattern and Family Size

Family pattern and family size indicates the fabric of sentimental attachment among the family members, social value, economic structures, and financial burden. The earlier survey findings shows that majority of surveyed families were joint (97.66%) followed by 2.04%

nuclear family. Family size has been classified into three categories i.e. small (2-4), medium (5-7) and large (7 & above).

The latest survey findings shows that all the surveyed families are nuclear in nature with small family size.

C. Educational Attainment

Education is a tool for vertical mobility in the society. It provides an opportunity to participate in the process of growth and development. However, it also creates differences among people and introduces a new kind of inequality between those who have it and those who do not. In all the cases, education is a basic need and the best indicator of socio-economic development of a region. The initial survey finding **Error! Reference source not found.** shows that majority of educational attainment of PAPs is upto upper primary which is 46.77% followed by high school (26%). About 16.8% PAPs have studied up to primary school. Around 6.2% have completed their graduation. Remaining 4.1% PAPs are reported as illiterate. It is observed that no PAPs undergone post -graduation and technical courses.

As per new Aol, the educational attainment of PAPs reveals that 50% PAPs (22.22% male and 27.78% female) are literate up to upper primary followed by high school which is 27.78% (16.67% male and 11.11% female), 11.11% PAPs (5.56% male and 5.56% female) are graduate and 11.11% PAPs (11.11% female) are up to primary level. No illiterate persons reported in survey findings.

D. Main Occupation of PAFs

Occupational pattern of the surveyed PAPs was recorded to assess their skill so that income generation plan can be prepared accordingly for alternative income generating scheme. Secondly, occupational pattern helps in identifying dominating economic activity in the area. The initial survey findings shows that 82% of surveyed PAFs were employed in business/trade activities. Most of the shopkeepers are self-employed. Out of the total surveyed PAPs, 16% were salaried both in private sector whereas 1% government servants and artisans were reported respectively. However, majority of PAPs were working in business/trade.

After latest scrutiny, the survey results show that 44.44% of PAPs belong to the working-class population who are above 18 years of age and less than 60 years of age. Out of the total working-class population, 62.50% of PAPs are working. 40% of PAPs are engaged in business activities, and 60% are engaged in private sector jobs.

E. Family monthly income

The initial census socio-economic survey findings show that majority of families (46.64%) had monthly income in between Rs.20001 to Rs. 30000. Earlier average income of a family

was Rs. 22,439/-. The BPL cut off of Maharashtra state is Rs. 15,000 per month. However, during socio-economic survey only ration card has been considered to identify BPL families.

At present, the average income of a family is Rs. 30, 000/- per month.

4.6 Environmental and Social (E&S) Profile of Project Aol

Environmental and Social features such as religious structure, archaeological sites, paleontological, historical, architectural, natural sites, educational, hospital, irrigation canal, etc are identified within 200 m from proposed identified Railway Station as given in **Annexure 4.5**. Stations wise map showing Environmental and Social features are given at **Annexure 4.3** and photographs are shown in **Annexure 4.4**. Sensitive receptors like Hospitals and Educational Institutes within project Aol are given in **Table 4-18**.

Table 4-18: Hospitals and Educational Institutes within project Aol

Sr. No.	Railway Station Name	Category	E & S Profile	UIN
1.	Bhandup	School	KI Mehra Ubs English Primary School	1497
2.		Education Facility	High School and Jr College	1633
3.	Bhayandar	School	Municipality School	394
4.		School	Dominic Savio Vidyalaya	1438
5.		School	Divine Image English High School	1594
6.		School	Mira Bhayandar Municipal School	1597
7.		Hospital/Health Centre	Kottakkal Arya Vaidya Sala	1601
8.	Chembur	College	Dr B R Ambedkar College	164
9.		School	Dr Babasaheb Ambedkar High School	165
10.		School	New Model English High School, Tally Academy	404
11.		Hospital/Health Centre	Manjiri Juvekar Joshi Polyclinic	1124
12.		School	Station Chembur Urdu School	1331
13.		School	Samayak Deep Vidyalaya	1573
14.		Education Facility	Dr B R Ambedkar School and College	1618
15.		School	Dr B R Ambedkar Primary School	1621
16.	Dombivli	School	Euro Kids Pre School	176
17.		Education Facility	Kokane's Kohinoor Technical Institute	921
18.		School	Modern English Primary School	1539
19.		School	Mrs Premaben Nangi Ganji Haria Gujrati School	1540
20.		Hospital/Health Centre	Sanjivani Surgical Hospital	1651

Sr. No.	Railway Station Name	Category	E & S Profile	UIN
21.		Hospital/Health Centre	Dr Harne Hospital	1653
22.		School	Play School	1654
23.		Hospital/Health Centre	Nobal Hospital	1655
24.	Govandi	School	Municipal School	385
25.		School	Govandi Mun Hindi School	1572
26.	GTB Nagar	Education Facility	GNVS Institute of Management	1086
27.	Kandivali	Hospital/Health Centre	Dalvi Hospital	148
28.		School	Vyas School	568
29.		Hospital/Health Centre	Vighnaharta Hospital	592
30.		Hospital/health Centre	Aashirwad Hospital	593
31.		Hospital/health Centre	Asha Hospital	594
32.	Kasara	School	ZP School	601
33.		School	Primary School	1661
34.	Mankhurd	Religious Place	Masjid	357
35.		School	Rock-He Memorial Primary School	1571
36.	Mira Road	Education Facility	Indian Mobile Institute & Research Centre	943
37.		Hospital/Health Centre	Tirupati Nursing Home	1607
38.		Hospital/Health Centre	Matoshree Hospital	1608
39.	Mulund	Hospital/Health Centre	Ganatra Hospital	184
40.		School	Vidya Prabodhini English School	911
41.		University	IGNOU	1640
42.	Mumbai Central	-	-	-
43.	Nalla Sopara	School	St Joseph And Marry Convent School	657
44.		School	Summer Field School	1446
45.	Neral	Education Facility	Madrassa Nooriya Najmul	13
46.		School	Sunanda School	1664
47.	Santacruz	Hospital/Health Centre	Maharshi Dadhichi Hospital	21
48.		Hospital/Health Centre	R K Hospital	490
49.	Vasai Road	School	Rajiv Gandhi Hindi School	566
50.		Education Facility	NIIT	932

Sr. No.	Railway Station Name	Category	E & S Profile	UIN
51.		School	Zpurdu School Shanti Nagar	1105
52.		Education Facility	Lall Institute	1106
53.		School	Abhinav Primary School	1443
54.		School	Alnoor Primary English School	1444
55.		Hospital/Health Centre	Ravi Hospital	1586
56.	Ghatkopar	Hospital/Health Centre	Hindu Sabha Hospital	237
57.		School	Trushnall's School	305
58.		School	Mcgm School	364
59.		Hospital/Health Centre	Parakh Hospital	422
60.		College	Ramniranjan Jhunjhunwala College & Hindi High School	439
61.		Hospital/Health Centre	Sohum Health Care Centre	1341
62.		School	Shree Krishna Foundations Lakshya Prep High School & Jr College	1487

Source: RITES Field Studies December 2020

4.7 Conclusion

This chapter details the Environmental & Social baseline data of the project Aol, to give the overview of the environmental and social features of the project Aol. This would provide inputs for assessing the impact of the proposed development by MRVC on environment and social features of the project Aol.

CHAPTER 5. ENVIRONMENT AND SOCIAL RISK AND IMPACT ANALYSIS

5.1 General

The primary function of an environmental and social impact assessment study is to quantify and predict and quantify the magnitude of impacts, evaluate and assess the importance of the identified changes and formulate plans to monitor and mitigate the actual changes. Environmental and social impacts could be positive or negative, direct or indirect, local, regional or global, reversible or irreversible. The process begins by identifying the development and operational activities resulting from the proposed project as contained in **Chapter-3** and **Chapter-4** provided information on the baseline environmental and social conditions for various parameters. Impacts likely to result from the proposed development have been described under the following categories.

- Impacts due to Project Location and Design.
- Impacts due to Construction; and
- Impacts due to Project Operation.

For each of these, potential impacts, recommendations for mitigation measures have been detailed in next Chapter.

5.2 Environmental and Social Impacts

This section identifies and appraises the impacts on various aspects of the social and physical environment likely to result during various phases of project cycle.

5.3 Impacts due to Project Location and Design

5.3.1 LOSS OF FOREST

The identified 17 proposed railway stations are situated in urban area. An inventory of trees affected has been prepared based on the conceptual plan & GAD of identified stations provided by MRVC. Approximately 254 trees are likely to be impacted. Out of 254 trees 153 trees need to be cut and 101 needs to be transplanted. Stations wise number of trees likely to be cut and transplanted is given in **Table 5.1** and details of trees are given in **Annexure 4.1**. All species are exotic, and no fruit bearing trees are observed during field survey and no rare or endangered species of trees have been noticed during field studies.

Table 5-1: Station-wise List of Trees to be Cut/Transplant

Sr. No.	Station Name	Number of Tree	Cut	Transplant
1	Mumbai Central	4	1	3
2	Kandivali	25	17	8
3	Nalla Sopara	0	0	0
4	Mulund	46	37	9
5	Bhandup	7	7	0
6	GTB Nagar	5	1	4
7	Chembur	3	1	2
8	Govandi	8	3	5
9	Mankhurd	12	0	12
10	Neral	122	79	43
11	Kasara	2	2	0
12	Dombivli	10	0	10
13	Vasai	0	0	0
14	Bhayandar	1	1	0
15	Mira Road	7	4	3
16	Ghatkopar	2	0	2
17	Santacruz	0	0	0
Total		254	153	101

Source: Field Studies by RITES Team

5.3.2 ENCROACHMENT INTO FOREST LANDS AND LOSS OF FOREST PRODUCE

As Aol of 17 identified stations proposed in this project do not fall in Forest Land, no encroachment into forest land and loss of forest produce are anticipated.

5.3.3 ENCROACHMENT INTO NATURAL RESERVES

The Aol of 17 identified stations proposed in this project do not fall under notified ecological sensitive areas like national park, biosphere reserve, wildlife sanctuary, nature reserve, community reserve. Hence, no impacts on natural reserves are anticipated.

The MoEFCC issued draft notification dated 8th April 2021 has an area of 16.90 square kilometers.) The Eco-sensitive Zone shall be to an extent of 0 (zero) to 3.89 kilometres around the boundary of Thane Creek Flamingo Sanctuary and the area of the Eco-sensitive Zone is 48.32 square kilometres.

For the Thane Creek Flamingo Sanctuary (TCFS) Ecological Sensitive Zone (ESZ) has been notified by MoEFCC. The Eco-sensitive Zone shall be to an extent of 0 (zero) to 3.89 kilometres around the boundary of Thane Creek Flamingo Sanctuary and the area of the Eco-sensitive Zone is 48.32 square kilometres. 8 identified stations namely Mankhurd station, Bhandup station, Govandi station, Mulund station, Chembur station, GTB Nagar station and Ghatkopar station are located within 10 km from the boundary of TCFS. However, the project does not require environmental clearance, Therefore, NOC from National board of Wildlife (NBWL) is not required for this project.

As per Sanjay Gandhi National Park final notification vide dated 5 December 2016. None of the proposed station comes under ESZ. Therefore, NOC from NBWL and wildlife clearance is not required for the project.

Impact on Critical species and Natural Habitat within the Aol:

The Aol of proposed stations in this project do not fall under notified ecological sensitive areas of Thane Creek Flamingo Sanctuary and Sanjay Gandhi National Park.

Sanjay Gandhi national park ESZ is 1.5 km towards East direction from the proposed development activity. The Park is known for Leopard (*Panther pardus*) which is schedule –I as per wildlife protection act 1972 and vulnerable species as per International Union for Conservation of Nature (IUCN). As per the leopard census conducted in 2018 total 47 leopard's area recorded from SGNP. The study was conducted by SGNP Director Anwar Ahmed and Nikit Surve from the Wildlife Conservation Society-India (WCS-India). Some leopards are reported from IIT, Mumbai which is 3.5 km from the proposed development activity. The proposed station Aol is surrounded by thick blanket of Slum area which acts as natural barrier between Leopards and proposed development site. As per ESF and ESS6 critical species (Leopard) not find any threshold towards proposed development activity.

The Thane Creek Flamingo Sanctuary is known for lesser flamingo, greater flamingo species and other birds. The lesser flamingo is Near Threatened species as per IUCN. The Conjure mangrove mudflat is feeding habitat of lesser flamingo. The feeding habitat is 1.0 km radial distance from the proposed development activity planned at Bhandup station. Baseline noise Leq level recorded from Bhandup station is 68db. The noise is important factor which triggers the population of flamingos in buffer area of Thane creek flamingo sanctuary from the months of October to May. The agriculture land is present between Source and Receptors. Mumbai –Agra expressway divides the landscape which acts as barrier between proposed development activities. Proposed development activity will not affect the ecological functions.

5.3.4 EFFECT ON WATER RESOURCES INSIDE AND OUTSIDE THE PROJECT

The surface water resource is not available within the Aol of 17 identified stations proposed in this project except Mankhurd Station. However, the major improvement at Mankhurd station is proposed on western side and the water body is located on eastern side. Hence no impact on water resources is anticipated.

5.3.5 CLIMATE RISK

The Aol of 17 identified stations proposed in this project are in Zone III as per revised Seismic Zoning Map of India corresponding to moderate seismic hazard. The impact of earthquake cannot be predicted, only precautionary measures would reduce the impact. Engineering construction will be done to meet Codal provisions of Bureau of Indian

Standards (IS: 1893-Part-1:2002) so that they can withstand the seismic forces. No other climate risk is anticipated due to this project.

5.3.6 IMPACTS ON HISTORICAL AND CULTURAL MONUMENTS

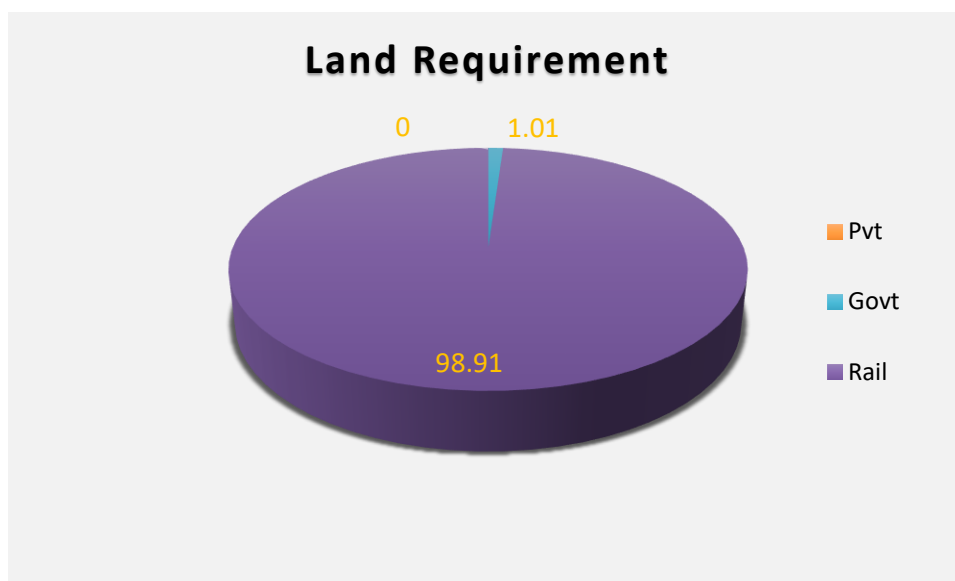
No Historical and Cultural Monuments are falling under the AoI of 17 identified stations. Hence, no impact on Historical and Cultural Monuments is anticipated. As such, NOC under The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 is not required. However, if there is any chance finds of archaeological or heritage value is discovered during excavation done for the purpose of construction. This will be deal as per the Article 23 of The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 covers procedure to deal with antiquities discovered during archaeological excavations. However, chance finds discovered during excavation for other purposes are to be dealt in accordance with Indian Treasure Trove Act, 1878, modified up to the 1st September, 1949. Treasure is defined as “anything of any value hidden in the soil, or in anything affixed thereto”.

The steps involved in dealing with chance finds are as follows:

- a. Notice by finder of treasure to Collector
- b. Notification by Collector requiring claimants to appear
- c. When treasure may be declared ownerless, such treasure shall either be delivered to the finder or be divided between him and the owner of the place in which it has been found. When no other person claims as owner of place, treasure to be given to finder.
- d. The Collector, may, at any time before delivering or dividing the treasure declare his intention to acquire on behalf of the Government the treasure or any specified portion thereof, by payment to the persons entitled thereto and thereupon such treasure or portion shall be deemed to the property of the Government.
- e. Decision of Collector is final.

5.3.7 LOSS OF LAND

Land requirement for 17 stations improvement has been kept at minimal requirement from the private land holders. Out of the 17 stations land acquisition on the private land has been completed eliminated minimised and eliminated from the proposed stations. The proposed project will require 15.85 ha of land. Out of the total land requirement, majority of land (98.99%) belongs to railway authority whereas 1.01% of land is other government department. In order to minimise the impact, private land acquisition is not being considered in this project. There will be no private land acquisition in any of the stations. However, the Joint Measurement Survey (JMS) with Revenue Officials will confirm the exact land requirement area for the project. The required government land will be transferred from the respective departments to MRVC for the project. Station wise affected lands are vis given in **Figure 5.1**.

Figure 5.1: Station wise Affected Land Area


Source: RITES Field Studies December 2020/Sept-Oct 2021

5.3.8 IMPACT ON STRUCTURES

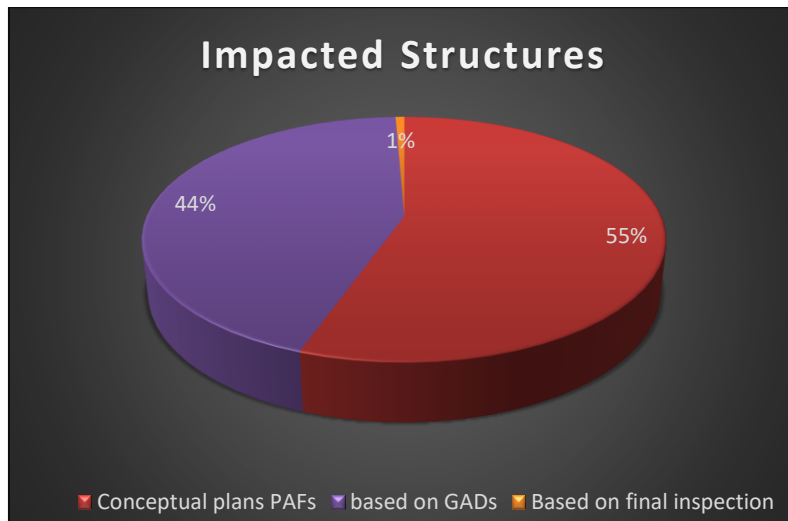
The final impacts on structural properties falling within the proposed station improvement area have been estimated through census survey. The survey results indicate the impact of the project on different types of structures. The initial survey findings revealed that total 343 structures were getting affected. The changes being made in the project design to minimise land acquisition and involuntary resettlement impacts. The number of affected structures were reduced from 343 structures to only nine structures. The nine affected structures include five commercial unit at Chembur station and four residential unit at Mumbai Central station. The affected units are developed on the government land and used by the squatters. Station wise impacted structures indicated in below **Table 5.2** and **Figure 5.2**.

Table 5-2: Station-wise impacted structures

Sr. No	Station name	Based on conceptual plan Dated 26.08.2020	Based on detailed GADs Dated (15.09.2021)	Based on joint site visits and discussion with MRVC dated 14/07/2021 & 16/07/2021 04/09/2021, 10/11/2021 05/09/2021,
1	Bhandup	30	0	0
2	Mulund	18	0	0
3	Ghatkopar	0	223	0
4	Dombivli	0	36	0
5	Neral	12	0	0

Sr. No	Station name	Based on conceptual plan Dated 26.08.2020	on Based on detailed GADs Dated (15.09.2021)	Based on joint site visits and discussion with MRVC dated 14/07/2021 & 16/07/2021 04/09/2021, 05/09/2021, 10/11/2021
6	Kasara	0	3	0
7	GTB Nagar	40	54	0
8	Chembur	13	9	5
9	Govandi	37	0	0
10	Mankhurd	9	0	0
11	Vasai Road	9	0	0
13	Bhayandar	0	0	0
14	Nalla Sopara	195	0	0
15	Mira Road	3	0	0
16	Kandivali	27	0	0
17	Mumbai Central	40	18	4
	Total	433	343	9

Figure 5.2: Station wise Affected Land Area



Source: RITES Field Studies December 2020 / Sept-Oct 2021

5.3.9 IMPACT ON FAMILIES & PERSONS

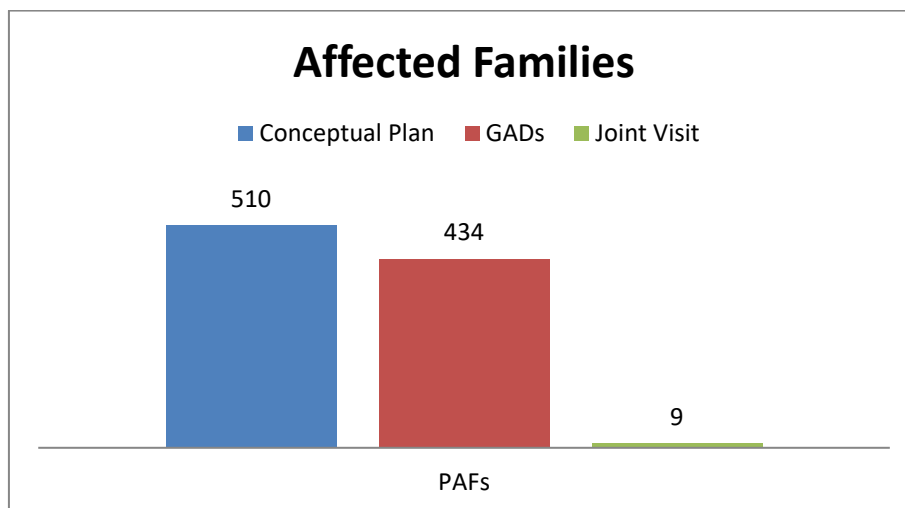
Based on the initial study findings, there were total 343 families and 434 persons who were getting affected in the entire project. The changes being made in the design to avoid land acquisition and involuntary resettlement, the number of affected families and persons were reduced. Station wise affected families are presented in **Table 5.3** and **Figure 5.3**.

As per new Aol, five affected structures used as a commercial unit consist of five PAPs at Chembur station and four affected structures used as a residential unit consist of 13 PAPs at Mumbai Central station are likely be affected by the project. Total nine families and 18 PAPs are likely be affected by the proposed developments.

Table 5-3: Station-wise Impacted Families

Sr. No	Station name	Based on conceptual plan Dated 26.08.2020	Based on detailed GADs Dated (15.09.2021)	Based on joint site visits and discussion with MRVC Dated 14/07/2021 & 16/07/2021 04/09/2021, 05/09/2021, 10/11/2021
1	Bhandup	28	0	0
2	Mulund	18	0	0
3	Ghatkopar	0	223	0
4	Dombivli	0	36	0
5	Neral	13	0	0
6	Kasara	0	0	0
7	GTB Nagar	40	54	0
8	Chembur	8	9	5
9	Govandi	37	0	0
10	Mankhurd	9	0	0
11	Vasai Road	9	0	0
12	Bhayandar	0	0	0
13	Nalla Sopara	195	0	0
14	Mira Road	3	0	0
15	Kandivali	110	0	0
16	Mumbai Central	40	18	4
	Total	510	434	9

Figure 5.3: Station wise Affected Families



Source: RITES Field Studies 2021 / Sept-Oct 2021

5.3.10 LOSS OF LIVELIHOOD

Out of the total PAFs, five PAFs will lose their source of livelihood at Chembur station. Out of total, two commercial units are headed by men, and three commercial units are headed by women.

5.3.11 IMPACT ON WOMEN

The initial survey findings show that due to the proposed station improvement, about 343 families, consisting of 434 persons were affected. Among the affected persons, more than one-third were women. A total of 135 women PAFs were reported and, only two women-headed households were affected. The changes being made in the project design to avoid impact on people. As per the revised design, only 10 women will likely be affected by the project. Out of total, three women at Chembur and seven women at Mumbai Central Station are reported.

5.3.12 IMPACT ON VULNERABLE FAMILIES

As regards vulnerability among PAFs, initially there were 11 PAFs who belong to vulnerable category. Out of these two PAFs were women headed households, two PAFs were Scheduled Caste (SC) and seven PAFs were Scheduled Tribes (ST). Both Scheduled Castes and Scheduled Tribes are considered as vulnerable group as per the provisions of Constitution of India these people are traditionally vulnerable and get preferential treatment in the government benefits. During census & socio-economic survey, only ration card has been considered to identify BPL families.

As per latest design, three women headed household has been reported who are losing their livelihood due to the proposed development at Chembur Station.

5.3.13 IMPACT ON COMMUNITY PROPERTIES

As per latest modifications, common property resources have been saved in GTB Nagar, after final alterations, no common community properties will be affected.

5.3.14 GREEN BUILDING FEATURES

The development of 17 identified stations including planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms. In accordance with the GRIHA (version 2015) norms. In addition to GRIHA, the following important aspects will be considered by MRVC during detail design of proposed stations:

- Gender Sensitivity will be covered under the Scope of Consultancy for Detailed Design Engineering. To provide measures like improved lighting, better security, Clean Washrooms, Installation of CCTC Cameras at isolated spots and Entry-Exit etc.

- At the Concept Plan stage, care has been taken that at least one FoB is provided with Elevators at each Platform. Other facilities and details to be worked out by Detailed Design Consultant.
- During the detail design provision of toilets for women have to be twice the number for men in terms of stalls.
- The roof should be coated light and high SRI paints and or china mosaic tiles Heat Island effect for roof. Use material with high solar reflective index value to cover the exposed roof areas by $\geq 75\%$
- Increase of awareness of green practices among commuters and staff by comprehensive signage programme on green education/ Environmental awareness campaigns
- Installation of Permanent entry system such as grates, grills, and air curtains at all entry / exit points.
- At least 75% of daylight in all occupied areas of concourse and platform areas.

5.4 Impacts due to Project Construction

5.4.1 SOIL POLLUTION AT CONSTRUCTION SITES

The location of proposed development is plain area, hence cutting and filling having less impact on topography of the area. Cutting and filling will be balanced. During excavation upper layer of soil will be stored for use of it after construction works to grow vegetation on it. The excavated earth will be stabilized soon after the construction is over.

The Impact on soil owing to the construction includes soil erosion, compaction, and pollution of soil in case of waste discharge on land. The impact on soil will be short term & insignificant and limited to construction activities area. However, proactive mitigation measures have been given next chapter.

5.4.2 WATER POLLUTION AT CONSTRUCTION SITES

The primary concerns relating to water quality associated with construction activities are pointed out below:

- Runoff related to unpaved and excavated areas during the rain shower.
- Sediments transported to runoff from the construction site.
- Run off related to area where lubricant, fuel other materials are stored, used and disposed, off.
- Water quality may be affected with the discharge of the runoff from the project site. The impact to the surface water bodies could arise from the increased soil erosion from excavated site only causing increase in the suspended particles and turbidity of runoff water from the site. However, this impact will be temporary in the nature and would be observed in first rain only and as soon as rain is over excavated soil at site

would be stabilized. Therefore, the surface water quality during rains will be impacted marginally for very short duration.

The surface water resource is not available within the AoI of 17 identified stations proposed in this project except Mankhurd Station, however the major improvement proposed at Mankhurd stations is on western side and the water body is located on eastern side. Hence no impact on water resources is anticipated.

5.4.3 AIR AND NOISE POLLUTION

Air Pollution: Emissions to the atmosphere from construction sites include particulates (that is dust, construction equipment/machineries emissions). Such emissions can have adverse off-site impacts if they are not properly managed or controlled. Emissions can occur from any of the following activities:

- Clearing of land and related excavation and compaction activities.
- Operation of machinery and related equipment for earthmoving and construction purposes (excavators, cranes, etc.) and the engines associated with such machines.
- Erection of structures using steel, concrete, brick, glass, timber, and other materials.
- Metal joining and finishing including welding, brazing, soldering and other techniques.
- Generation of solid wastes and debris, their stockpiling and transfer during loading onto trolleys.
- Transport of building materials and supplies onto the site.
- Movement of vehicles.

Air pollution occurs mainly due to fugitive emissions/dust generation from various construction activities during construction period and use of DG set during operation period. The construction activities for the proposed stations include civil, mechanical and electrical works. Civil construction works require concreting and brickworks. Concreting works require concrete mixer and concrete vibrators for good workmanship for which portable type are suggested. Other equipment are mini crane, concrete vibrator, and drill machine. These equipment and machinery will be operated by electricity. There will be vehicular movement during construction and use of DG set during power cut; hence air pollution will be there at 17 stations. The frequent checking of construction equipment and machineries will be undertaken to keep the pollution at minimal level.

During the construction phase, SPM is expected to be the main pollutant associated with on-site roads (paved and unpaved) and material handling. In this case, pollution emission sources shall be distributed throughout the 17 identified stations and shall fall under the category of area source. The site locations of 17 identified stations are flat, so extensive formation work is not expected. It is assumed that most of the excavated material shall be used within the project, with minimal cut and fill material to come from outside the site.

Due to the confined nature of construction activity during limited period, tailpipe emissions from construction equipment are assumed to be negligible. However, proactive mitigation measures have been given next chapter.

Noise Pollution: Noise is a contributing factor to degradation of human health. The major sources of noise pollution during construction are movement of vehicles for transportation of material and equipment. Noise emissions levels from construction equipment (Construction Noise Handbook, FHWA, USA) are given in

Table 5-4. Actual noise from construction equipment (Lmax) measured at 50 feet distance ranged from 74 dB (A) to 96 dB (A), which decreases with increase in distance.

Table 5-4: Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) at 50 ft from source
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane Derrick	88
Crane Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Sonic)	96
Pneumatic Toll	85
Pump	76
Roller	74
ScRPer	89
Shovel	82
Truck	88
Welder	74

Source: Construction Noise Handbook, FHWA

Exposure to noise may lead to complete hearing loss, tension, fatigue, fast pulse/ respiration rates, dizziness & loss of balance, anger, irritation, and nervousness in extreme case. Construction of noise barriers, such as temporary walls between noisy activities and receivers reduces noise by up to 15 dB (A) and vegetation cover also reduces the noise level. As all the 17 identified stations baseline noise exceeds the standards, hence, mitigation measures are proposed in next chapter to reduce the construction noise pollution.

5.4.4 VIBRATION IMPACT

Construction activities have the potential to produce vibration that may be annoying or disturbing to humans and may cause damage to the structures. Architectural and even structural damage to existing structures surrounding a site could occur if appropriate precautions are not taken. Vibration generated by construction activities is categorized into ground borne and sound generated vibration. Vibration produced during construction activities are transmitted through the ground to nearby structures.

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations which spread through the ground and diminish in strength with distance. Building founded on the soil in the vicinity of the construction site responds to these vibrations, with varying results ranging from no perceptible effects at the lower levels, low rumbling sounds and feeble vibrations at moderate levels and slightly damage at the highest levels. Ground vibrations from construction activities very rarely reach the levels that can damage structures but can achieve the audible and feeble ranges in buildings very close to the site.

The construction activities will be carried out for foundation, FOB, Deck etc. Trucks/vehicle movement, Rock drilling will be used for foundation. Use of construction machinery and equipment will be of short term and hence insignificant impact on structures and no inhabitants are anticipated. Additional protection to mitigate the construction vibration is, frequent checking of construction equipment's and machineries and by avoiding night-time activities. Since the primary concern about construction vibration is building damage, construction vibration is assessed in terms of peak particle velocity (PPV). Vibration source levels for typical construction equipment are provided in the **Table 5-5**.

Table 5-5: Vibration Source Levels for Construction Equipment*

Equipment		PPV at 25 ft (in/sec)	Approximate L _v [#] at 25 ft
Pile Driver (impact)	upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	Typical	0.170	93
Calm shove drop (slurry wall)		0.202	94

Equipment		PPV at 25 ft (in/sec)	Approximate L _v [#] at 25 ft
Hydro mill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	85
Jackhammer		0.0345	79
Small bulldozer		0.003	58
# RMS velocity in decibels (VdB) re 1 μinch/sec			

**References:*

- D.J. Martin "Ground Vibrations from Impact Pile Driving during Road Construction" Supplementary Report 544, United Kingdom Department of Environment, Department of Transport. Transport and Road Research Laboratory, 1990
- J.F. Wiss, "Vibration During Construction Operations. "Journal of Construction Division, Proc. American Society of Civil Engineers, 100, No. CO3, pp, 239-249, September 1974
- J.F. Wiss, "Damage Effects of Pile Driving Vibrations, "Highway Research Record, No. 155, Highway Research Board, 1967.
- David A. Towers and Yuki Kimura, "Central Artery/Tunnel Project: Hydromill Vibration Testing" report prepared for Massachusetts Highway Department, February 1995.

Construction vibration should be assessed in cases where there is a significant potential for impact from construction activities. Such activities include blasting, pile driving, demolition and drilling or excavation near sensitive. Using the following formula peak particle velocity (PPV) in in/sec of the equipment adjusted for the distance (D) can be estimated and apply the vibration damage threshold criteria and vibration potential annoyance criteria to evaluate potential vibration impacts as given in **Table 5-6** and **Table 5-7**.

$$PPV_{\text{equip}} = PPV_{\text{ref}} \times (25/D)^{1.5}$$

Table 5-6: Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous /Frequent intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Table 5-7: Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous /Frequent intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

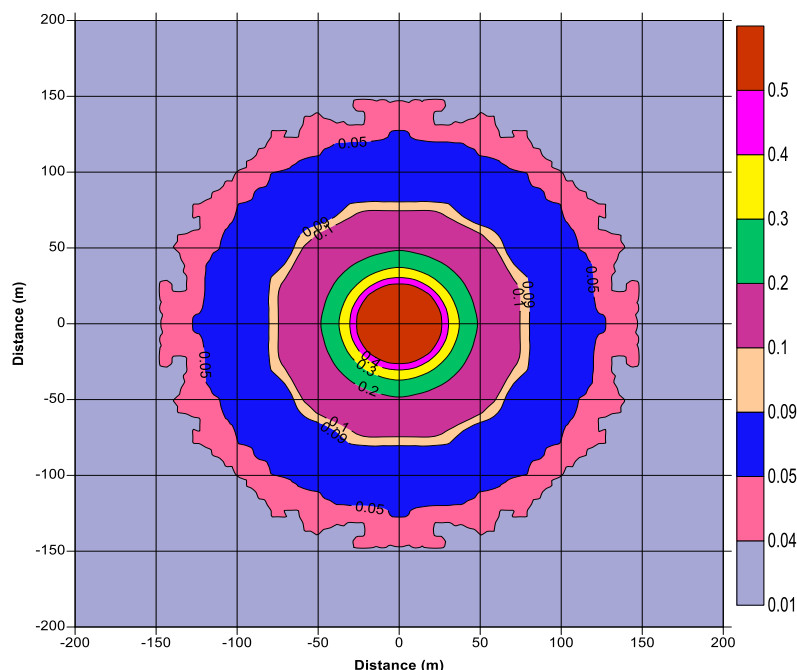
Spatial variation of estimated peak particle velocity (PPV) around continuous operation of the pile driver (impact) construction equipment is shown in **Figure 5.4**. The vibration amplitude at 150 m distance from continuous pile driving is predicted to be 0.04 in/sec and is well below the damage potential threshold even for extremely fragile historic buildings, ruins, ancient monuments (0.08 in/sec). As there is no such building within this distance, hence potential for any structural damage is very low.

Further, **Table 5-7** suggests that continuous vibration amplitude 0.04 in/sec would be distinctly perceptible; indicating that operation of pile driving could lead to annoyance of building occupants if living within 150 m.

5.4.5 IMPACT DUE TO MUCK DISPOSAL

The location of proposed 17 identified stations development are in plain area, hence cutting and filling will be less. The source of muck generation is excavation for foundation. The muck generated will be reutilised at the same station. Hence, impact due to disposal of muck is anticipated to be negligible.

Figure 5.4: Spatial Variation of PPV (in/sec): Construction Phase



5.4.6 IMPACT DUE TO HAZARDOUS WASTE

Hazardous waste would mainly arise from the maintenance of equipment which may include used engine oils, hydraulic fluids, waste fuel, spent mineral oil/cleaning fluids from mechanical machinery, scrap batteries or spent acid/alkali, spent solvents etc. Unsafe disposal can result in water and soil pollution. Hence, proactive mitigation measures have been given next chapter. This project involves demolition of old structure which may create asbestos issues. The necessary mitigation measures have been given next chapter for handling of Hazardous waste.

5.4.7 IMPACT ON WATER SUPPLY, SEWAGE DISPOSAL AND SOLID WASTE MANAGEMENT DUE TO LABOUR CAMP

Stations identified for development lie on three different lines of Mumbai Suburban rail network and labour requirement at each station would be about 30 persons during peak construction activity and labour is expected to be locally available in the project area. As such, labour camps are not anticipated in this project. However, the following code of conduct to avoid gender-based violence are as under:

1. Compliance with applicable National and Company laws, policies, rules, and regulations (including policy on sexual harassment).
2. Compliance with applicable health and safety requirements to protect the Local Community (including vulnerable and disadvantaged groups), the Employer's Personnel, and the Contractor's Personnel (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment).
3. Will not use illegal substances.
4. Will not discriminate in dealing with the local community and all co-workers. Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinions, national, ethnic or social origin, property, disability, birth or other status.
5. Will not indulge in Sexual Harassment (for example prohibition of the use of language or behaviour, in particular towards women and/or children, that is inappropriate, abusive, sexually provocative, demeaning or culturally inappropriate).
6. Non-Violence, including sexual and/or gender-based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberties).
7. No Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods or services for sex, including sexual favours or other forms of humiliation, degrading behaviour, exploitative behaviour, and abuse of power).
8. Refrain from Sex with anyone under the age of 18 and that the breach of this code will incur sanctions that could impact employment.

9. Will not mix/ interact with children including sexual activity or abuse, or otherwise unacceptable behaviour towards children (anyone under the age of 18), and ensure their safety in the project areas.
10. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer).
11. Avoid conflict of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favours, are not provided to any person with whom there is a financial, family, or personal connection).
12. Respect reasonable work instructions (including environmental and social norms).
13. Protection and proper use of property (for example, to prohibit theft, carelessness or waste).
14. Will attend training for the duration of the contract for understanding this Code of Conduct.
15. Will report violations of this Code. All staff must report suspected or actual violations by a fellow worker, whether in the same contracting firm or not. Reports must be made through the GRM setup for this purpose.
16. Sanctions may be applied if an employee is confirmed to be a gender-based violence perpetrator. The sanctions will be proportional to the transgression and in accordance with applicable laws and policies.
17. Non- retaliation against workers who report violations of the Code, if that report is made in good faith.

5.4.8 SOIL EROSION AND LAND SUBSIDENCE

Soil Erosion: Any ground-breaking activity for construction works, whether permanent or temporary, would require removal of vegetation cover from ground. Runoff from unprotected excavated areas, etc., would result in increased soil erosion.

The location of proposed development is plain area, and no natural drainage is available at the construction site of 17 identified stations. However, during rainy seasons, runoff from unprotected excavated areas, etc., would result in increased soil erosion. Proactive mitigation measures are given the next chapter.

Land Subsidence: The proposed project of improvement of 17 identified stations does not involve the deep excavations; hence, occurrence of land subsidence is not anticipated.

5.4.9 WATER CONSUMPTION

Water will be required for the civil construction work and for labours and staffs involved in construction. Water demand during construction phase would be for Construction activities and manpower involved in construction. About 30 persons are expected to be working at site during peak construction at each of 17 identified stations. Water demand during

construction for labours is estimated about 1.35 KLD at each station. The water requirement will be met through the existing water supply system at the stations.

5.4.10 IMPACT DUE TO SUPPLY OF CONSTRUCTION MATERIAL

Construction material such as aggregate and earth are sourced from quarries site approved by the Government and having legal permits so that environmental impacts as well as wastage of natural resources are minimized.

5.4.11 IMPACT DUE TO CONSTRUCTION/DEMOLITION WASTE

Construction and Demolition (C&D) waste is part of solid waste that results from land clearing, excavation, construction, demolition, remodelling and repair of structures, roads, and utilities. C&D waste has the potential to save natural resources (stone, river sand, soil etc.) and energy, reduce transportation over long distances for dumping, and reduce space occupied at landfill sites. Storage, handling and disposal of Solid, Hazardous and Construction & Demolition (C&D) waste material: Packaging, labelling, and transport of hazardous and other wastes is required to be done as per the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016. In case of C&D waste, the Contractor will handle the waste as per Construction and Demolition Waste Management Rules, 2016.

5.5 Conclusion

This chapter details the impacts of proposed development at identified stations during different stage of project implementation and measurement. A critical analysis of the impact suggests that even though the project will result in loss of livelihood for some and will impact some community structure, but it will greatly improve the passenger convenience at stations.

The mitigation measures to minimise the project impacts have been detailed in next chapter.

CHAPTER 6. ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

6.1 Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) contains details of proposed remedial measures and monitoring plan for the location & design, construction and operational phase of the project. The ESMP often contains construction/management guidelines that specifically address how the project proponent/contractors are to incorporate environmental and social considerations into their work. This chapter spells out the set of measures to be undertaken during project preparation, project construction and operation to mitigate or reduce the adverse environmental & social impacts and bring them to acceptable levels based on the proposed Environmental and Social Management Plans.

6.2 ESMP due to Project Location and Design

6.2.1 COMPENSATORY AFFORESTATION

Based on the RITES field study, approximately 254 trees have been impacted with the proposed development at identified 17 proposed railway stations. Out of 254 trees 153 trees are proposed to be cut and 101 proposed to be transplanted. Details of impacted trees are given in **Annexure 4.1**. Total number of trees proposed for compensatory plantation is 459 (3 times the number of trees to be cut) with 5 years maintenance. The species of trees recommended for compensatory plantation are given in **Table 6-1**. Location of land for plantation and transplantation will be decided by MRVC, in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) as well Forest Department.

Table 6-1: Trees Recommended for Compensatory Plantation

S. No	Botanical Name	Common Name	Local Name
1	<i>Bauhinia racemosa</i>	Bidi Leaf Tree	Apata
2	<i>Albizia lebbek</i>	Woman's tongue tree	Siris
3	<i>Ficus religiosa</i>	Sacred fig	Pimpal
4	<i>Samania saman</i>	Indian rain tree	Indian rain tree
5	<i>Zizyphusmarutiana</i>	Chinese date	Bor
6	<i>Dalbergia shisoo</i>	North Indian rosewood	Shisam
7	<i>Syzygiumcumini</i>	Black plum	Jamun
8	<i>Mangifera indica</i>	Mango	Amba

S. No	Botanical Name	Common Name	Local Name
9	<i>Pongamia pinnata</i>	Pongame Oil Tree	Karanj
10	<i>Ficus glomerata</i>	Cluster fig tree	Gular
11	<i>Polyalthia longifolia</i>	False Ashoka	Khotaasoka
12	<i>Terminalia catapa</i>	Indian Almond	Jangalibadam
13	<i>Bombax ceiba</i>	Silk Cotton Tree	Katesawar
14	<i>Neolamarckiacadamba</i>	Burflower-tree	Kadam
15	<i>Pithecolobium dulce</i>	Sweet tamarind	Chinchbilai
16	<i>Azadirachta indica</i>	Margosa tree	Neem
17	<i>Cassia auriculata</i>	Tanner's Cassia	Tarwad
18	<i>Delonix regia</i>	Flamboyant	Gulmohar
19	<i>Ficus benghalensis</i>	Indian banyan	Vad

The estimated cost for compensatory plantation and transplantation for impacted trees is given in **Table 6-2**:

Table 6-2: The Cost of Compensatory Plantation and Transplantation

S No	Item	Rate Per Tree	No. of Tree	Total Cost (Rs)
1	Plantation including 5 years maintenance	8,158	459	37,44,522
2	Transplantation plantation including 3 years maintenance	16,822	101	16,99,022
Total				54,43,544

Guidelines for Plantations:

- Plantation will be made in the monsoon months (July-August)
- The height of the plants should not be less than 30 cm and should be supplied in polythene
- Bags are not to be removed until the moment of planting
- All plants supplied must be planted within three days after transported from the nursery
- Arrangements must be made to water in case of insufficient rains after planting
- Provide compost/manure suggested quantity for each pit before plantation

Guidelines for Transplantation: The trees recommendation for transplantation will be transplanted in the nearby open area. The guidelines for transplantation of trees are summarized below:

- Preliminary root investigation should be carried out
- Health diagnosis of the tree should be carried out for treating infected trees
- Soil condition where the tree has to be transplanted is thoroughly checked & necessary treatments are applied to the soil after digging a pit
- The pit size has to be kept in accordance with the root ball of the tree
- Packing material should be strong enough to hold the soil around the root zone
- Crane should be used to lift the packed tree and a trolley or truck should be used to transport the tree
- Timely feeding of the plant should be done with soluble fertilizers and watering
- JCB should be used for digging pits
- There should be regular monitoring for fertilizer schedules and the chemicals like insecticides and pesticides
- Scaffolding should be used wherever required to support the trees
- Any broken stems during transplantation should be removed cautiously
- After transplantation, there are chances of external infections to the tree which needs maintenance

6.2.2 GREEN BUILDINGS

Green building (also known as sustainable building) refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. Green buildings help in better preservation of environment as in such structures there are provisions for better saving of energy, water and CO₂. Such buildings also have better waste management arrangements. The proposed development of 17 identified stations including planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms. The following measures shall be implemented to a feasible degree at station locations.

Low Impact design:

- Control annual Heat Gain through favourable orientation and design of facades.
- Use of trees to control heat gain.
- Site planning according to contours

- Site plan designed to preserve existing vegetation/ existing water bodies /other topographical features like boulders etc.
- Manage storm water on site through rainwater harvesting.

Mitigate heat island effect: building surface visible to sky is shaded by trees etc.

Air and water pollution control during construction:

- Covering of fine aggregate and excavated earth on site with plastic/geotextile sheets
- Water sprinkling on fine aggregate (sand) and excavated earth.
- All diesel gensets on site to have proper chimneys with their outlet facing away from the site.
- Develop and implement a spill prevention plan (to control effects of spill from hazardous materials like bitumen, diesel etc.) on site.

Construction Management:

- Adopt strategies to prevent/reduce movement of soil (except topsoil) outside the site through adoption of various strategies (like soil erosion channels, sedimentation control etc.)
- Adopt strategies to manage water during construction.
- Using gunny bags for curing and using ponding for curing
- Monitoring to avoid leaks and water wastage.
- Use of additives to reduce water requirements during curing.
- Use of treated wastewater/captured storm water.
- A construction waste management plan for segregation of construction waste, its safe storage and on-site/off-site recycling.

Energy efficiency: Ensure outdoor lighting fixtures (lamps + lamp housing) meet the luminous efficacy requirements.

Renewable Energy utilization: On-site renewable energy system installation to offset a part of the annual energy consumption of internal artificial lighting systems. The provision for utilisation of solar energy will be considered during details design as per the Indian Green Building Council (IGBC) norms.

Low ODP materials: Ensure use of materials in building insulation, refrigeration equipment and firefighting systems with low ozone depleting potential.

Indoor Comfort: The intent of this criterion is to ensure that the building spaces are designed to deliver visual, thermal, and acoustical comfort to building occupants in terms of Shading of windows, daylight access, thermal comfort, indoor noise levels.

Indoor Air Quality: To ensure design and monitoring of ventilation systems such that indoor air quality meets the minimum requirements, as recommended in the standards.

Low-VOC paints and adhesives: Promote use of low-VOC and lead-free interior paints as well as low-VOC adhesives and sealants to maintain good indoor air quality for the project occupants.

Reduce landscape water demand: Promote the planting of native/naturalized flora and use of water efficient irrigation system to reduce the demand for landscape water.

Water Quality: Ensuring quality of water available for use during building operation is important from two perspectives – Overall hygiene for building occupants as well as longevity of plumbing systems. It is also important to ensure that the water being discharged from the site meets the relevant disposal norms. Water used for various purposes like drinking, irrigation etc. shall conform to the BIS standards.

Rainwater recharge: To promote the recharge of groundwater aquifers.

Sustainable building materials: To use BIS recommended wastes (such as fly ash, blast furnace slag etc.), having properties like conventional construction materials for building construction. These being low embodied energy materials as well as waste products, reduce the need for virgin materials in the building structure and help divert waste from landfills. If economical it shall be implemented.

Use of low environmental impact materials for interiors: To promote installation of low environmental impact materials in the building stones from India, Composite wood-based products, manufactured products with at least 5% recycled content, products with water footprint (cradle to gate) analysed and published as per ISO 14046, false ceilings/internal partitions/panelling/in-built furniture/flooring/internal door & window panels & frames.

Avoided post-construction landfill: To provide infrastructure to future occupants of the project so that they can sustainably manage on-site solid waste during operation phase.

- Provide infrastructure (multi-coloured dustbins/different garbage chutes) to ensure segregation of waste at source
- Provide dedicated, segregated, and hygienic storage spaces in the project site to store different wastes before treatment /recycling
- Provide contractual tie-ups with waste recyclers for safe recycling for recyclable wastes like metal, paper, plastic, glass etc.

Labour Safety and Sanitation: To ensure safe, healthy, and hygienic working & living conditions for construction workers working in the project.

- Ensure compliance with the NBC (2005) safety norms for providing the necessary safety
- Equipment and measures for construction workers - Mandatory
- Ensure provisions for drinking water, hygienic working & living conditions and sanitation facilities shall be provided for the workers - Mandatory
- Provide a crèche facility for children of construction workers

Design for Universal Accessibility: To promote adoption of measures in the project to make it universally accessible.

- Compliance with National Building Code norms on Requirements for Planning of Public Buildings Meant for Use of Physically Challenged

Dedicated facilities for Service Staff: To promote provision of resting spaces and toilets dedicated for project's service staff resting rooms, toilets.

Increase in Environmental awareness: To create awareness on sustainability amongst the building users & visitors.

6.2.3 LAND REQUIREMENT

The proposed project will require 15.85 ha of land . Out of the total land requirement, 98.99% is existing railway land and 1.01% is other government department land. Efforts were made by the MRVC to utilize existing railway land to avoid private land acquisition and involuntary resettlement for the proposed development.

6.2.4 COMPENSATION FOR LOSS OF STRUCTURES

The initial survey findings revealed that total 343 structures were getting affected. The changes being made in the project design to minimise land acquisition and involuntary resettlement impacts. The number of affected structures were reduced from 343 structures to only nine structures. The nine affected structures include five commercial unit at Chembur station and four residential unit at Mumbai Central station. The affected units are developed on the government land and used by the squatters. Compensation and assistance for loss of structure will be given as per Entitlement Matrix of this report

6.3 ESMP during Construction

Measures to mitigate impacts observed during construction shall be implemented by Contractor and duly monitored by MRVC.

6.3.1 SOIL AND WATER POLLUTION MANAGEMENT AT CONSTRUCTION SITES

As such, the impact on soil quality and water quality is short term in nature, which can be avoided by applying good construction practices. During construction, excavation, vehicles and equipment's generate loose soil, oil & grease, which may pollute the soil and water. These oil spills may enter the runoff, which ultimately contaminate the natural drains. To control the soil and water pollution during construction stage of the project following measures should be taken and cost will be part of civil contract:

- On completion of the construction activity, all the unpaved area shall be covered with vegetation, which will reduce soil erosion.
- All excavation activities should be minimising on non-rainy days.
- Restoration of the open places to original after completion of construction activities.
- Compaction and stabilization during filling in such a way that no loose soil is washed away with runoff during rains. Silt trap can be used to confine the soil erosion.
- Used oil shall be collected and stored in leak proof drums and sent for recycling. The used oil drums shall be properly identified with a label in local language and in English.
- Good housekeeping.
- Regular maintenance and inspection of equipment and vehicles for damaged hoses, leaky gaskets and other service problems. Care shall be taken to prevent any oil spill during fuelling of construction machinery, vehicles.
- No equipment washing shall be done at construction site
- Temporary cement/metal platform will be provided below the construction machineries and at maintenance site to capture the spill. These platforms should be at sufficient height to avoid the littering.
- Conducting routine inspections to ensure proper functioning.
- Runoff water from project site should not enter into nearby water bodies. If required, sandbags shall be used to control the flow path of runoff from the construction site by diverting runoff around areas prone to erosion, such as steep slopes.
- Oil and grease removal trap will be provided in the storm water collection system.
- Oil and grease will be separated out in a container for sale/disposal.

6.3.2 AIR POLLUTION MANAGEMENT

During construction period the impact on air quality will be mainly due Particulate Matter along haul roads and emission from vehicles and construction machinery. Though the estimation of air quality during construction shows insignificant impact on ambient air quality, following mitigation measures shall be adopted to reduce the air pollution and their cost will be part of civil contract:

- Water sprinkling at the construction site as per requirement.
- Stockpiled earth material shall be sprayed with water to minimize dust generation. During construction, the amount of disturbed area shall be minimized.
- Onsite vehicle speeds should be reduced to 10 kmph or less.
- Vehicles carrying construction material shall be covered to avoid spilling.
- Every day the haul road at the construction site shall be inspected and the debris left by the tractor - trolleys shall be removed as early as possible.
- As the vehicular movement may lead to fugitive dust in the area, hence provisions shall be made for sprinkling of water on the roads at least once a day during the entire construction period. Idling of delivery trucks / tractors and other construction equipment's should not be permitted during the periods when they are unloaded or are not in active use.
- Concrete batching plant should be located at or near the project site so that the requirement of transit mixers/ delivery trucks is minimized.
- Operation time of construction machinery should be optimized through modifications in the work schedule.
- As soon as the construction activity is over the surplus earth should be utilized to fill up the low-lying areas, if any.
- All stationary machines / DG sets emitting the pollutants shall be inspected weekly for maintenance and should be fitted with exhaust pollution control devices.
- Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time.
- After clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil shall be treated immediately by watering or re-vegetation or spreading soil binders to minimize dust generation until the area is paved or otherwise developed so that dust generation will be minimized.
- Grading and scrap operations shall be suspended when necessary to minimize dust generation.
- All roadways, driveways, and sidewalks associated with construction activities should be paved as soon as possible.
- The work schedule and the operation time of construction machinery should be suitably modified and have limited construction activity to exercise a control on ambient air quality standards.

6.3.3 NOISE POLLUTION MANAGEMENT

The prime sources of noise levels during the construction phase are the construction machinery, vehicular movement, loading/unloading and material stocking operations. Careful planning of machinery operation and scheduling of operations can reduce the noise levels. Though the impact may be minimal, the following measures shall be considered and implemented and the cost of these measures will be part of civil contract.

- Construct walled enclosures around especially noisy activities or clusters of noisy equipment.
- Construct noise barriers, such as temporary walls or piles of excavated materials between noisy activities and noise receivers.
- Strategic placement of stationary equipment, such as compressors and generators.
- Scheduling work to avoid simultaneous activities that generates high noise levels,
- Avoid night-time activities. Sensitivity to noise increase during the night-time hours in residential neighbourhoods. Project construction activities that generate noise in excess of 65 dB (A) at the project site boundary shall be limited to the hours of 7 a.m. to 6 p.m.
- For protection of construction workers, earplugs should be provided to those workers who will be working very close to noise generation source.
- Job rotation of construction workers
- Use of hydraulic tools instead of pneumatic tools,
- Use of electric equipment instead of diesel-powered equipment.

6.3.4 VIBRATION MANAGEMENT

The mitigation measures to reduce the construction vibration are:

- Route heavily-loaded trucks away from residential and sensitive areas.
- Construction activities shall be scheduled such that demolition, earthmoving and ground-impacting operations do not occur in the same time period.
- Avoid night time construction activities.

6.3.5 MUCK DISPOSAL MANAGEMENT

The excavated material shall be graded to determine if it can be re-used in construction. Any unusable excavated material will be disposed at the identified disposal site. Before excavation, the Contractor will be required to conduct TCLP test for the soil quality including heavy metals and the results will be compared with standards. If the soil is contaminated, disposal will be done with due treatment or isolation of such muck.

Disposal sites will be identified by MRVC in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) such that environment of water bodies and green areas are not impacted. The following activities will be involved for muck disposal:

- Material will be stock-piled with suitable slopes
- Material will be stabilised each day by watering or other accepted dust suppression techniques. The muck shall be filled in the dumping site in layers and compacted mechanically.
- Once the filling is complete, the entire muck disposal area shall be provided with a layer of good earth on the top and covered with vegetation.

6.3.6 HAZARDOUS WASTE MANAGEMENT

The Hazardous waste management should be handled by authorised/licensed agent as per guidelines of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 & its amendments. It shall be the responsibility of the contractor to ensure that hazardous wastes are labelled, recorded, stored in impermeable containment and for periods not exceeding mandated periods and, in a manner, suitable for handling storage and transport. The contractor shall maintain a record of sale, transfer, storage of such waste and make these records available for inspection. The contractor shall approach only Authorized Recyclers for treatment and disposal of Hazardous Waste, under intimation to the Project Authority. The treatment and disposal sites will be identified by MRVC in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) such that pollution of water bodies and green areas are not impacted, and displacement of persons is not involved.

6.3.7 SOIL EROSION AND LAND SUBSIDENCE MANAGEMENT

The cutting and filling operations may lead to erosion due to loosening of topsoil. Temporary erosion/sedimentation and pollution control measures will be used to control the phenomenon of erosion, sedimentation and pollution that may develop during normal construction practices. The soil erosion at construction site can be minimized by following measures:

- Excavation will not be carried out during monsoon.
- Erosion control measures such as ramming of topsoil immediately after the excavation and provision of silt control measures to minimize soil erosion.
- Ensure that no soil is left unconsolidated before completion of work at the site.
- Construction material shall be procured from the licensed material supplier.

- The excavated earth debris will be transported immediately to the disposal site and no accumulation shall be allowed at construction site.
- Soil erosion can also be controlled by efficient storm water management.

To manage land subsidence, measures including maintaining adequate distance of the trench from existing structures adjacent to the trench, measures to support the walls of the trench as well strengthen soil underneath adjacent structures will be required.

6.3.8 CONSTRUCTION MATERIAL MANAGEMENT

The material will be loaded and unloaded by engaging labour at both the locations by the contractor. The duties of the contractor will include monitoring all aspects of construction activities, commencing with the storing, loading of construction materials and equipment in order to maintain the quality. During the construction period, the construction material storage site is to be regularly inspected for the presence of uncontrolled construction waste.

The scheduling of material procurement and transport shall be linked with construction schedule of the project. The Contractor shall be responsible for management of such construction material during entire construction period of the project. Sufficient quantity of materials should be available before starting each activity. The contractor should test all the materials in the Government labs or Government approved labs in order to ensure the quality of materials before construction. This is also the responsibility of the contractor, which would be clearly mentioned in the contractor's agreement.

6.3.9 CONSTRUCTION/DEMOLITION WASTE MANAGEMENT

Construction and Demolition (C&D) waste is part of solid waste that results from land clearing, excavation, construction, demolition, remodelling and repair of structures, roads and utilities. C&D waste has the potential to save natural resources (stone, river sand, soil etc.) and energy, reduce transportation over long distances for dumping, and reduce space occupied at landfill sites. Storage, handling and disposal of Solid, Hazardous and Construction & Demolition (C&D) waste material: Packaging, labelling, and transport of hazardous and other wastes is required to be done as per the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016. In case of C&D waste, the Contractor will handle the waste as per Construction and Demolition Waste Management Rules, 2016. C&D waste generated from construction has potential use after processing, grading solid waste and recycling. The following mitigation will be adopted:

- All generated C&D waste shall be collected at designated place; segregate in to soil, inert material as concrete, bricks, mortar, and recyclables as plastic, steel etc.
- Sale of metal scrap and other saleable waste.

- Inorganic solid waste generated during the construction phase like waste concrete, and mortar, left over aggregate and debris etc. shall be recycled for use in the base layers of paved area i.e. parking pavement or in road construction or in filling the low laying areas.
- The soil will be stacked and use for landscaping, recyclable will be sold to recyclers, and other C&D waste handover to authorized recycler for construction and demolition waste processing facilities.
- Identification of intended transport means and route.
- Obtaining permission, where required, for treatment of the hazardous component and its disposal.
- The treatment and disposal sites will be identified by MRVC in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan DombivliMunicipal Corporation (KDMC), Mira Bhayandar Municipal Corporation (MBMC) such that pollution of water bodies and green areas are not impacted, and displacement of persons is not involved. Before dumping, recyclable material will be removed. The disposal sites will be cleaned and then treated so that leached water does not contaminate the ground water.

6.3.10 OCCUPATIONAL HEALTH AND SAFETY

The construction works shall be carried out in accordance with all applicable legislation and Indian statutory requirements and guidelines-OHSAS 18001-2007: Occupational Health and Safety Management System and ISO 14001-2015: Environmental Management Systems. The EHS manual should be prepared in line with National regulations. The key elements of the EHS manual are as follows:

1. Identification of the unit responsible for co-ordinating and monitoring the Contractor's EHS performance.
2. Procedures for identifying and estimating hazards, and the measures for addressing the same; a list of EHS hazards anticipated.
3. EHS training courses and emergency drills.
4. EHS inspections to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the EHS Plan and its supplementary procedures and programs: Planned General Inspection, Routine Inspection, Specific Inspection and Other Inspection.
5. Safety Audit: EHS Audit to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current EHS legalisation regulations and requirements of the employer; Electrical Safety Audit; External EHS Audit.

6. EHS Communication to communicate the Safety, Occupational health and Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site.
7. EHS Reporting – reports, minutes, inspection reports, audit reports.
8. Accident reporting and investigation
 - Reports of all accidents (fatal/injury) and dangerous occurrences to the Employer
 - Reporting to Govt. organisations
9. Investigations of Accidents and Dangerous Occurrences, Near misses and minor accidents.
10. Prepare an Emergency Response Plan for all work sites including injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue. If any accident happens, root cause analysis should be done and the incident report should be submitted to AIIB within two days.

Workplace safety and occupational health shall be ensured with special focus on following areas:

- Housekeeping
- Working at Height and Falling objects and Danger areas
- Lifting Appliances
- Construction machinery, tools equipment - Safe worthiness
- Employ qualified electrical personnel on site and requirements of electrical equipment, distribution etc
- Lighting
- Exposure of worker to use of exhaust or harmful gases in confined locations
- Fire prevention, protection and fighting system
- Demolition
- Excavation
- Traffic Management
- Personal Protective Equipment (PPE)
- Reporting which will contain results of monitoring and inspection programs
- Process of response to Inquiries, complaints and requests for information from private and government entities
- Physical fitness of workmen
- Medical Facilities on site: Occupational Health Centre, Ambulance van and room HIV/AIDS prevention and control
- Exposure to Noise – prevention measures
- Ventilation and illumination

6.3.11 LABOUR WELFARE

All the facilities should be provided as per Building and Other Construction Workers Act, 1996 (BOCWA). Some of the measures are detailed below:

Shelter at Workplace: At every workplace, shelter will be provided free of cost, separately for use of men and women labourers. The height of shelter will not be less than 3m from floor level to lowest part of the roof. Sheds will be kept clean and the space provided shall be on the basis of at least 0.5m² per head.

First aid facilities: At every workplace, a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances will be provided. Suitable transport will be provided to facilitate taking injured and ill persons to the nearest hospital.

6.3.12 EXISTENCE OF ENCROACHERS AND SQUATTERS' ISSUES

It has been observed that there will be a total of 18 PAPs who are identified as encroachers who will be affected. No squatters were observed during the survey in project area. These encroachers are considered for compensation and assistance as per the entitlement matrix, as mentioned in Chapter 2 of this Report. The primary concerns are the likely impacts of elevated noise levels, deterioration of ambient air quality, etc. MRVC, in consultation with the contractor, shall ensure the ESMPs will be implemented to minimise the environmental impacts due to project activities.

But after several scrutiny, the existence of encroachers and squatters has been reduced to minimise the involuntary resettlement and social impact. Five commercial units at Chembur Station and four residential units at Mumbai Central Station will likely be affected due to the proposed development.

6.4 ESMP during Operation

No negative impacts are anticipated during operation; hence no mitigation management and management plan is proposed.

6.5 Environment and Social Monitoring Plan

6.5.1 PRE-CONSTRUCTION PHASE

The environmental monitoring programme helps in signalling the potential problems resulting from the proposed project activities and will allow for prompt implementation of corrective measures. Pre-construction phase monitoring has been done for air, noise, vibration and water

and soil quality as part of this report for the proposed project. The results so obtained are documented in Chapter 4.

6.5.2 CONSTRUCTION PHASE

Monitoring schedule for the entire period of construction (3 Years) is summarized in **Table 6-3**. The number of locations could be modified based on need when the construction commences. Monitoring should be carried out by NABL Accredited/MoEFCC recognized private or Government agency. The contractor will be responsible for carrying out monitoring during construction under the supervision of Project Implementation Agency (PIA). The results of air monitoring, water quality monitoring, noise monitoring and soil quality monitoring will be submitted to PIA quarterly during construction phase.

Table 6-3: Construction Stage Monitoring Schedule

Parameter	Locations and Frequency	Reference/Standard	Implementation by / Approval by
Air	1 day monitoring in Month at 1 location at 17 identified stations for entire construction period.	<ul style="list-style-type: none"> Guidelines for Ambient Air Quality Monitoring, CPCB, 2003 National Ambient Air Quality Standards 2009 	Contractor/MRVC
Noise	1 day monitoring in Month at 1 location at 17 identified stations for entire construction period.	<ul style="list-style-type: none"> Protocol for Ambient Level Noise Monitoring, CPCB, May 2015 	Contractor/MRVC
Water	1 in a season, 1 season in a year at 17 identified stations for entire construction period.	<ul style="list-style-type: none"> Guide Manual – Water and waste water analysis, CPCB Drinking water – Specifications IS 10500: 2012 and CPHEEO Manual 	Contractor/MRVC
Soil	1 in a season, 1 season in a year at 17 identified stations for entire construction period.	US EPA test protocols	Contractor/MRVC

Workers Health and Safety: Epidemiological studies at construction sites will be performed to monitor the potential spread of diseases. Regular inspection and medical check-ups shall be carried out for workers health and safety monitoring. Any recurrence of health incidents shall be recorded, and appropriate mitigation measures shall be taken. Contractor will be

responsible to take care of health and safety of workers during construction and project proponent is responsible to review/audit the health and safety measures/plans.

The environmental monitoring cost during construction phase is estimated as **Rs 79.56 Lakh**. The estimated cost towards environmental monitoring during construction will be part of civil contract and details are given in **Table 6-4**.

Table 6-4: Environmental Monitoring Cost during Construction

S. No	Item	Quantity	Total Cost (Rs)
1	Air Quality Monitoring	17 Samples X 12 times in a year X 3 Years	39,78,000
2	Noise Quality Monitoring	17 Samples X 12 times in a year X 3 Years	9,18,000
3	Soil Quality Monitoring	17 Samples X 4 times in a year X 3 Years	13,26,000
4	Water Quality Monitoring	17 Samples X 4 times in a year X 3 Years	17,34,000
Total			79,56,000

6.5.3 OPERATION PHASE

No negative impacts are anticipated during operation; hence no mitigation management, management plan and monitoring are proposed.

6.6 ESMP Reporting Arrangement and Institutional Strengthening

Supervision involves periodic checking to ascertain whether activities are going according to the plans. It provides necessary feedback for project management team to keep the program on schedule. The supervision and reporting process with respect to implementation status of mitigation measures during construction will initiate from the contractor at the lowest rung who will report to the Project Implementation Agency (PIA).

During construction phase of the project, the ESMP implementation comprises of the following key activities:

- Implementing various mitigation and enhancement measures within the time frame recommended
- Overseeing the implementing various mitigation and enhancement measures and fine tuning/advocating more measures, if needed, depending on site conditions;
- Project level monitoring of key performance indicators to evaluate the implementation of ESMP measures at the recommended intervals.

- Periodical reporting of status of ESMP implementation and monitoring results and key performance indicators and
- Constant evaluation of ESMP measures implemented based on the data available from project level monitoring and status reports and providing directions accordingly.

These activities are to be carried out by various agencies involved in the implementation of the project. It is also to be noted that all these activities will be carried out concurrently or at regular intervals and at different duration and location. This makes it pertinent that all agencies involved work within a predefine setup. The identified agencies and their sphere of work are presented in following section.

Project Implementation Agency (PIA): The responsibility of implementing environmental and social mitigation measures lies with the PIA. PIA in this project will be Mumbai Railway Vikas Corporation Limited (MRVC). The responsibility also includes various tasks such as notifying various affected parties such as the resident and commercial establishment, facilitate the relocation of people, notify other utility departments such as telephone, water supply, sewerage etc. which used the road for providing public utility services.

The PIA will get the ESMP implanted for managing engineering and construction related activity. The PIA will take the responsibility of effective implementation through existing social cell. The social cell will have an environmental and social officer/expert.

Project Contractor: Project contractor will implement the ESMP measures, enhancement measures and measures as directed by PIA. The responsibility to implement the ESMP measures will be built into the contractual agreement. The contractor shall submit a report on compliance of environmental and social mitigation measures periodically to the PIA. The PIA will review and approve the Environmental and Social Compliance Report (ESCR) submitted by the contractor and submits the ESCR to AIIB.

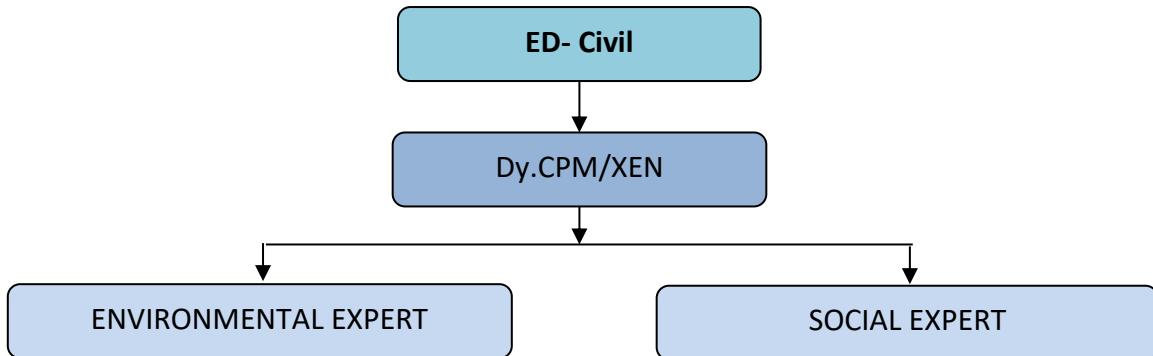
MRVC: An apex organization and PIA shall initiate to coordinate process among the concern organization for ESMP implementation. MRVC shall take lead in

- Reviewing the progress of the project for the subsequent year- institution wise
- Reviewing and discussing the salient features of the report in the year on environmental and social aspects and their violations
- Organizing and coordinating training programs for all member organization

Environmental and Social Cell already exist in MRVC which will play crucial role in implementation of ESMP and Environmental and Social Monitoring Plan (ESMoP). The Environmental and Social Cell comprises staff and structure is shown in

Figure 6.1.

Figure 6.1: ESMP Monitoring Structure



6.7 Environment and Social Management System (ESMS)

Environment Management System is intended to facilitate implementation, tracking and reporting on Environment and Social Management Plan and Environment and Social Monitoring Plan proposed for the project. Roles and responsibilities for preparation and Implementation of Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) are summarized in **Error! Reference source not found..**

6.8 COMMUTERS MANAGEMENT PLAN

1. The location plans show commuter’s entry/exit points near the construction area. These are the areas where movement of commuters may get affected during construction period.
2. Contractor to visit the site and make sure of requirement of temporary alternate approach pathways required during construction, areas for storage of construction material and areas & extent to which removable barricading may be required for access control. All measures required to ensure that commuter’s movement is safe and least affected, shall be provided at no extra costs.
3. The signage, barricading and other safety and environmental monitoring requirements shall be as per EMP and to be provided at no extra costs.
4. The contractor is required to prepare detailed construction methodology plan covering these areas and get the same approved from the client/ engineer before commencement of construction work.

6.9 Traffic Management Plan

1. Road Traffic Management

Where construction activity will affect or likely impact the efficiency and safety of road and related transport networks (including traffic flow, access, parking and user safety), the Contractor shall develop, assess, and implement appropriate management measures in consultation with the relevant road authority, transport operator, and emergency services, as relevant.

This will be required for movement of man, material and machinery to the construction site nearest to the railway premises.

2. The basic requirements of Road Traffic Management to be followed during construction activity to ensure that:

- (i) Road capacity is sufficient to accommodate construction vehicle traffic volumes and that disruptions are minimized.
- (ii) Appropriate warning and information signs are installed to provide advance warning of changed traffic conditions.
- (iii) Information and guidance is provided on how to make the construction site safe from construction vehicles.
- (iv) Understand the requirements of barricades for pedestrians, public transport passengers, motorists, cyclists etc.
- (v) The movements and choice of construction vehicles are considered
- (vi) Work activities are planned and undertaken so as to minimize any adverse impacts and to ensure that the traffic normalcy is resumed in shortest possible time.
- (vii) Daily inspections on implemented Traffic Management Plans are performed by suitably trained staff.
- (viii) Measures for managing parking impacts, including any proposed alternative parking arrangements are developed.
- (ix) Pedestrian impacts are identified and managed.

3. CONSULTATION/ PERMISSION FROM ROAD AUTHORITIES

Necessary permissions shall be obtained from Municipal Corporation (MCGM)/ MBMC/VVCMC traffic department and Road Authorities such as Commissioner of traffic. Details of the barricade construction, area of enclosure and period of work are required to be submitted to the satisfaction of the authority.

4. HOURS OF WORK AND NOISE

The hours of construction and work on the development must be as follows:

Loading and unloading of goods between 00:00 hrs to 4:00 am on Mondays to Saturdays, with safety inspections being permitted at non-peak hours on work days. No work must be carried out on Sundays or public holidays.

5. COVERING OF LOADS & VEHICLES CLEANING

All vehicles involved in the excavation and/or demolition process and departing the property with demolition materials, spoil or loose matter must have their loads fully covered before entering the public roadway.

Prior to the commencement of work, suitable measures are to be implemented to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site. It is an offence to allow, permit or cause materials to pollute or be placed in a position from which they may pollute waters

6. LOADING AND UNLOADING DURING CONSTRUCTION

The following requirements apply:

- (a) All loading and unloading associated with construction must be accommodated on site.
- (b) If, during excavation, it is not feasible for loading and unloading to take place onsite, a Works Zone on the street may be considered. Prior approval is required from authorities.

7. NO OBSTRUCTION OF PUBLIC WAY

The public way must not be obstructed by any materials, vehicles, refuse, skips or the like, under any circumstances.

8. USE OF MOBILE CRANE

- a. For special operations including the delivery of materials, and erection and dismantling of onsite tower cranes which warrant the on-street use of mobile cranes, permits must be obtained from authorities for the use.
- b. In the case of full road closures and partial road closures which can create significant traffics disruptions, the authorities shall be informed well in advance and necessary permissions to be obtained.
- c. Mobile cranes operating from the road must not be used as a method of demolishing or constructing a building.
- d. Special operations and the use of mobile cranes must comply with the approved hours of construction.

9. IMPACTS DUE TO TRAFFIC

Contractor shall ensure that demolition and construction related impacts (including construction noise and vibration, loading, issues associated with construction workers and vehicles, traffic issues, management of the construction site) from the site can be dealt with expeditiously and cooperatively.

10. TRAFFIC MANAGEMENT PLAN

Traffic Management Plan shall address following sections

- i. Site location and road network
 - ii. Approved development
 - iii. Overall principles for traffic management
 - iv. Hours of work
 - v. Truck routes
 - vi. Traffic and parking effects
 - vii. Pedestrians
 - viii. Consultation
 - ix. Pedestrian and traffic management plan
 - x. Construction site access, including the efficient and safe egress and ingress of vehicles
- 11.** The movement of trucks on and off the site to be managed and controlled by appropriately qualified site personnel in accordance with a Safe Work Method Statement and Traffic Control Plans;
 - 12.** Truck movements to and from the site to be restricted. Contractor shall provide a diagram showing designated truck routes.
 - 13.** Parking management, including on and off street and remote parking and access haulage management, including works to facilitate haulage vehicles, the restriction of haulage vehicles in peak traffic periods;
 - 14.** Pedestrian activity across the site access driveways will be managed and controlled by appropriately qualified site personnel;
 - 15.** Reversing movements to and from will be supervised by appropriately qualified traffic controllers
 - 16.** Pedestrian warning signs to be displayed at appropriate locations
 - 17.** Pedestrian arrangements, construction activity and erection of safety fencing will be provided
 - 18.** Mass movement of vehicles in and out of construction site such as RMC delivery Trucks, debris removal from site etc. – Preferred time non-peak hours
 - 19.** Restriction on movement of vehicles through congested roads, narrow lanes having sharp turning radius

- 20.** Safety in transporting heavy machinery at site such as use of slings, hoists or jacks for blocking or preventing falling or shifting of machinery.
- 21.** Neutral position of motors / Engines and parking brakes set during parking and stoppage to be ensured
- 22.** Speed and overload restrictions.
- 23.** Compliance under Central Motor Vehicles Rules, 1989 and latest amendments.

Based on these guidelines Contractor shall prepare detailed traffic management plan and get the same approved by MRVC.

Table 6-5: Roles and Responsibilities – Preparation and Implementation ESMP

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
ESMP During Location and Design Phase				
1.	Encroachment into Natural Reserves	No wildlife Clearance will be required for those projects falling in 10km ESZ, which does not require environmental clearance. Therefore, NOC from National board of Wildlife (NBWL) is not required for this project.	-	-
2.	Climate Risk	Engineering construction shall be done to meet Codal provisions of Bureau of Indian Standards (IS: 1893-Part-1:2002)	DPR and design consultant	PIA
3.	Historical and Cultural Monuments	<p>No impact on Historical and Cultural Monuments are anticipated. Therefore, NOC under The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 are not required. However, if there is any chance finds of archaeological or heritage value is discovered during excavation done for the purpose of construction. This will be dealt as per the Article 23 of The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 covers procedure to deal with antiquities discovered during archaeological excavations. However, chance finds discovered during excavation for other purposes are to be dealt in accordance with Indian Treasure Trove Act, 1878, modified up to the 1st September, 1949. Treasure is defined as “anything of any value hidden in the soil, or in anything affixed thereto”.</p> <p>The steps involved in dealing with chance finds are as follows:</p> <ol style="list-style-type: none"> a. Notice by finder of treasure to Collector b. Notification by Collector requiring claimants to appear c. When treasure may be declared ownerless, such 	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<p>treasure shall either be delivered to the finder or be divided between him and the owner of the place in which it has been found. When no other person claims as owner of place, treasure to be given to finder.</p> <p>d. The Collector, may, at any time before delivering or dividing the treasure declare his intention to acquire on behalf of the Government the treasure or any specified portion thereof, by payment to the persons entitled thereto and thereupon such treasure or portion shall be deemed to the property of the Government.</p> <p>e. Decision of Collector is final.</p>		
4.	Green Building Features	<p>Planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms. In addition to GRIHA, the following import aspects will be considered by MRVC during detail design of proposed stations:</p> <ul style="list-style-type: none"> • Gender Sensitivity will be covered under the Scope of Consultancy for Detailed Design Engineering. To provide measures like improved lighting, better security, Clean Washrooms, Installation of CCTC Cameras at isolated spots and Entry-Exit etc. • At the Concept Plan stage, care has been taken that at least one FoB is provided with Elevators at each Platform. Other facilities and details to be worked out by Detailed Design Consultant. • During the detail design provision of toilets for women have to be twice the number for men in terms of stalls. 	DPR and design consultant	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<ul style="list-style-type: none"> The roof should be coated light and high SRI paints and or china mosaic tiles Heat Island effect for roof. Use material with high solar reflective index value to cover the exposed roof areas by $\geq 75\%$ Increase of awareness of green practices among commuters and staff by comprehensive signage programme on green education/ Environmental awareness campaigns Installation of Permanent entry system such as grates, grills, and air curtains at all entry / exit points. At least 75% of daylight in all occupied areas of concourse and platform areas. The provision for utilisation of solar energy will be considered during details design as per the Indian Green Building Council (IGBC) norms. 		
5.	Acquisition of land affecting private structures and households	Land will be acquired through direct purchase method and the amount of compensation shall be calculated as per the provision of Article 26 to 30 of RCTLARR 2013 & Schedule I, over and above of which 25% is paid.	Revenue Department, Govt. of Maharashtra	PIA
6.	Gender Issue	Ensure that women's needs are equally met through Resettlement Plan.	PIA	PIA
ESMP during Pre-construction Phase				
1.	Disclosure	Disclose to stakeholders the ESMP/ESMoP measures proposed to be implemented; upon feedback, revise the measures if necessary.	PIA	PIA
2.	Loss of trees	Total number of trees proposed for compensatory plantation	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		is 459 with 5 years maintenance and 101 proposed to be transplanted with 3 year maintenance. The estimated cost for compensatory plantation and transplantation for impacted trees is Rs. 54,43,544.00 (Rs. 5.44 million) .		
3.	Site measures	Prepare Environment, Health and Safety (EHS) Manual in line in accordance with all applicable legislation and Indian statutory requirements and guidelines	Contractor	PIA
4.	Environmental and Social Management and Monitoring	Implement institutional requirements for implementation of ESMP and ESMoP.	Contractor	PIA
5.	Impact on Livelihood	<ul style="list-style-type: none"> Relocation of shops only after new facilities is ready. The affected persons losing livelihood will be assisted to improve or at least restore their income levels to pre-project level as per the entitlement proposed. Identify Suitable income restoration schemes and implement. Provide employment opportunities to the affected persons during the construction phase by facilitating their engagement by the civil works contractor. 	Contractor	PIA
ESMP during Construction Phase				
1.	Soil and Water Pollution at Construction Sites	To control the soil and water pollution during construction stage of the project following measures should be taken and cost will be part of civil contract: <ul style="list-style-type: none"> On completion of the construction activity, all the unpaved area shall be covered with vegetation, which will reduce soil erosion. All excavation activities should be minimizing on non- 	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<p>rainy days.</p> <ul style="list-style-type: none"> • Restoration of the open places to original after completion of construction activities. • Compaction and stabilization during filling in such a way that no loose soil is washed away with runoff during rains. Silttrap can be used to confine the soil erosion. • Used oil shall be collected and stored in leak proof drums and sent for recycling. The used oil drums shall be properly identified with a label in local language and in English. • Good housekeeping. • Regular maintenance and inspection of equipment and vehicles for damaged hoses, leaky gaskets and other service problems. Care shall be taken to prevent any oil spill during fueling of construction machinery, vehicles. • No equipment washing shall be done at construction site • Temporary cement/metal platform will be provided below the construction machineries and at maintenance site to capture the spill. These platforms should be at sufficient height to avoid the littering. • Conducting routine inspections to ensure proper functioning. • Runoff water from project site should not enter into nearby water bodies. If required; sandbags shall be used to control the flow path of runoff from the construction site by diverting runoff around areas prone to erosion, such as steep slopes. 		

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<ul style="list-style-type: none"> • Oil and grease removal STP will be provided in the storm water collection system. • Oil and grease will be separated out in a container for sale/disposal. <p>The cost for Water and Soil monitoring will be Rs. 17,34,000.00 (Rs. 1.73 million) and Rs. 13,26,000.00 (Rs. 1.33 million) respectively.</p>		
2.	Air Pollution	<p>To reduce the air pollution are presented below and cost will be part of civil contract:</p> <ul style="list-style-type: none"> • Water sprinkling at the construction site as per requirement. • Stockpiled earth material shall be sprayed with water to minimize dust generation. During construction, the amount of disturbed area shall be minimized. • Onsite vehicle speeds should be reduced to 10 kmph or less. • Vehicles carrying construction material shall be covered to avoid spilling. • Every day the haul road at the construction site shall be inspected and the debris left by the tractor - trolleys shall be removed as early as possible. • As the vehicular movement may lead to fugitive dust in the area, hence provisions shall be made for sprinkling of water on the roads at least once a day during the entire construction period. Idling of delivery trucks / tractors and other construction equipment's should not be permitted during the periods when they are unloaded or are not in active use. 	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<ul style="list-style-type: none"> • Concrete batching plant should be located at or near the project site so that the requirement of transit mixers/ delivery trucks is minimized. • Operation time of construction machinery should be optimized through modifications in the work schedule. • As soon as the construction activity is over the surplus earth should be utilized to fill up the low-lying areas, if any. • All stationary machines / DG sets emitting the pollutants shall be inspected weekly for maintenance and should be fitted with exhaust pollution control devices. • Contractor’s transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. • After clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil shall be treated immediately by watering or re-vegetation or spreading soil binders to minimize dust generation until the area is paved or otherwise developed so that dust generation will be minimized. • Grading and scraping operations shall be suspended when necessary to minimize dust generation. • All roadways, driveways, and sidewalks associated with construction activities should be paved as soon as possible. • The work schedule and the operation time of construction machinery should be suitably modified and have limited construction activity to exercise a control on ambient air 		

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		quality standards. The cost for Air monitoring will be Rs. 39,78,000.00 (Rs. 3.97 million).		
3.	Noise Pollution	The following measures shall be considered and implemented and cost will be part of civil contract. <ul style="list-style-type: none"> • Construct walled enclosures around especially noisy activities or clusters of noisy equipment. • Construct noise barriers, such as temporary walls or piles of excavated materials between noisy activities and noise receivers. • Strategic placement of stationary equipment, such as compressors and generators. • Scheduling work to avoid simultaneous activities that generates high noise levels, • Avoid night time activities. Sensitivity to noise increase during the night time hours in residential neighborhoods. Project construction activities that generate noise in excess of 65 dB (A) at the project site boundary shall be limited to the hours of 7 a.m. to 6 p.m. • For protection of construction workers, earplugs should be provided to those workers who will be working very close to noise generation source. • Job rotation of construction workers • Use of hydraulic tools instead of pneumatic tools, • Use of electric equipment instead of diesel-powered equipment. The cost for Noise monitoring will be Rs. 9,18,000.00 (Rs. 0.92 million).	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
4.	Vibration	The mitigation measures to reduce the construction vibration are: <ul style="list-style-type: none"> • Route heavily-loaded trucks away from residential and sensitive areas. • Construction activities shall be scheduled such that demolition, earthmoving and ground-impacting operations do not occur in the same time period. • Avoid night time construction activities. 	Contractor	PIA
5.	Muck Disposal	The following activities will be involved for muck disposal: <ul style="list-style-type: none"> • Before excavation, the Contractor will be required to conduct TCLP test for the soil quality including heavy metals and the results will be compared with standards. If the soil is contaminated, disposal will be done with due treatment or isolation of such muck. • Material will be stock-piled with suitable slopes • Material will be stabilized each day by watering or other accepted dust suppression techniques. The muck shall be filled in the dumping site in layers and compacted mechanically. • Once the filling is complete, the entire muck disposal area shall be provided with a layer of good earth on the top and covered with vegetation. 	Contractor	PIA
6.	Hazardous Waste	The Hazardous waste management should be handled by authorised/licensed agent as per guidelines of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 & its amendments.	Contractor	PIA
7.	Soil Erosion and Land	The soil erosion at construction site can be minimized by		

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
	Subsidence	following measures: <ul style="list-style-type: none"> • Excavation will not be carried out during monsoon. • Erosion control measures such as ramming of topsoil immediately after the excavation and provision of silt control measures to minimize soil erosion. • Ensure that no soil is left unconsolidated before completion of work at the site. • Construction material shall be procured from the licensed material supplier. • The excavated earth debris will be transported immediately to the disposal site and no accumulation shall be allowed at construction site. • Soil erosion can also be controlled by efficient storm water management. 		
8.	Construction Material	Construction material such as aggregate and earth are sourced from quarries site approved by the Government and having legal permits so that environmental impacts as well as wastage of natural resources are minimized. The good construction practices will be followed.	Contractor	PIA
9.	Construction/Demolition Waste	Storage, handling and disposal of Solid, Hazardous and Construction & Demolition (C&D) waste material: Packaging, labeling, and transport of hazardous and other wastes is required to be done as per the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016. In case of C&D waste, the Contractor will handle the waste as per Construction and Demolition Waste Management Rules, 2016. C&D waste generated from construction has potential	Contractor	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<p>use after processing, grading solid waste and recycling. The following mitigation will be adopted:</p> <ul style="list-style-type: none"> • All generated C& D waste shall be collected at designated place; segregate in to soil, inert material as concrete, bricks, mortar, and recyclables as plastic, steel etc. • Sale of metal scrap and other saleable waste. • Inorganic solid waste generated during the construction phase like waste concrete, and mortar, left over aggregate and debris etc. shall be recycled for use in the base layers of paved area i.e. parking pavement or in road construction or in filling the low laying areas. • The soil will be stacked and use for landscaping, recyclable will be sold to recyclers, and other C&D waste handover to authorized recycler for construction and demolition waste processing facilities. • Identification of intended transport means and route. • Obtaining permission, where required, for treatment of the hazardous component and its disposal. • The treatment and disposal sites will be identified by MRVC in consultation with Brihanmumbai Municipal Corporation (BMMC), Kalyan Dombivli Municipal Corporation (KDMC), Mira-Bhayandar Municipal Corporation (MBMC) such that pollution of water bodies and green areas are not impacted and displacement of persons is not involved. Before dumping, recyclable material will be removed. The disposal sites will be cleaned and then treated so that leached water does not contaminate the ground water. 		

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
10.	Occupational Health and Safety	<ul style="list-style-type: none"> Implement measures as per EHS Manual In any accident happens, root cause analysis should be done and the incident report should be submitted to AIB within 2 days. 	Contractor	PIA
11.	Existence of Hutments and Encroachment issue	<ul style="list-style-type: none"> 15 day notice before start of work. Provide compensation to affected PAFs as per the proposed entitlement before start of work Ensure the appropriate EMPs are implemented to minimize the environmental impacts due to project activities. 	Contractor, Social Cell (PIA)	MMRDA
12.	Differential impacts on vulnerable and disadvantaged population	<ul style="list-style-type: none"> 15 days advance notice through poster and leaflet before start of work. Impacted vulnerable and disadvantaged population will be treated case by case basis by provision of assistance as given in RP. 	Contractor, Social Cell	PIA
13.	Gender Issue	<ul style="list-style-type: none"> Ensure safe lighting at work place and worker's colony along with separate access to female/male toilets if women workforce deployed at site. First aid medical facilities at the working site for pregnant women, elderly women and children. Ensure that women workforce are paid at par with male workers. Ensure adherence to provision of labour law. If women workers are deployed at sites, then day crèche facilities shall be provided to facilitate the women with infants working on site. 	Contractor, Social Cell	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<ul style="list-style-type: none"> Also address the aspirations and concerns of the women amongst the PAP community 		
14.	Community health and safety	<ul style="list-style-type: none"> Communication about the technical aspects of the construction activities to residential society members or representative of community around station. Allay fears about accidents; Simple diagrams and signage's in local language specially to demarcate trenches, storage areas etc.; Availability of first aid and emergency mitigation measures such as fire extinguishers at site. 	Contractor	PIA
15.	Temporary Pressure on local infrastructure resources	<ul style="list-style-type: none"> Avoid using and affecting local resources. Local water sources shall not be used for construction activities. Water shall be procured from outside or from the market. 	Contractor, EMP Cell	PIA
16.	Labour Welfare	<ul style="list-style-type: none"> All the facilities as per Building and Other Construction Workers Act, 1996 (BOCWA) will be provided. In addition to BOCWA Act, separate toilet facilities for women workers should be provided. Implement measures as per EHS Manual 	Contractor	PIA
17.	Likelihood of spread of HIV/AIDS among construction workers and roadside community	<ul style="list-style-type: none"> Coordinate with Maharashtra State AIDS Control Society to collect dissemination materials. Awareness and training to labour and community on HIV/AIDS and STDs Community based meetings, consultations in camp, distribution of leaf let, IEC communication, poster and banners. 	Contractor, Social Cell	PIA

S. No	Environmental and Social Impact	Mitigation Measure	Implementing Entity	Responsible Entity
		<ul style="list-style-type: none"> Programme convergence with State AIDSS Control Society 		
18.	Environmental Monitoring	Environmental Monitoring Plan for Air, Noise, Soil, and Water.	Contractor	PIA
19.	Grievances	Implement mechanism for project-level grievance redressal.	Contractor	PIA

1. Environmental Management Plan:

Table 6-6: Environment Management Plan (APPENDIX-1)

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
Pre-Construction Phase: Environment Management Plan (EMP)						
1	Licensed quarries	Since quarrying is a regulated activity and in order to minimize the direct and indirect impacts on land degradation, Contractor shall source aggregate etc., from licensed quarry operator for all construction activities. Contractor shall provide a copy of the valid Licenses to MRVC before final selection of quarry. Client (MRVC) shall be informed well in advance regarding change in the source.	Contractor	Engineer's Representative	Before start of work and before every change of quarry. Random inspection of quarry site.	License from authorized source. A copy of the valid licenses to be maintained by the contractor.
2	Sand mining	Since sand mining is a regulated activity and in order to minimize the impact on aquatic ecology and land degradation, Contractor shall source sand from a sand mine authorized/ approved by Ministry of Environment, Forest and Climate Change (MoEFCC). Contractor shall provide a copy of the valid License of mining operator to MRVC before final section of sand mine. Client (MRVC) shall be informed well in advance regarding change in the source.	Contractor	Engineer's Representative	Before start of work and every change of source of sand.	License from authorized source. A copy of the valid licenses/approvals to be maintained by the

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
					Random inspection of mining site	contractor.
3	Ready Mix Concrete (RMC)	In case Contractor proposes to use ready mix concrete (RMC), it shall be sourced from RMC plants approved by Maharashtra Pollution Control Board (MPCB)	Contractor	Engineer's Representative	Before start of work and every change of source RMC	A valid copy of NOC/ approval from MPCB for RMC plant to be maintained by the contractor.
4	Clearance of vegetation and Tree felling	In order to minimize disturbance in local ecology due to clearance of shrubs and bushes and tree trimming & tree felling following is suggested: 1. Avoid cutting of tree branches and shrubs to the extent possible. 2. Planting native trees/plants and enhancing biodiversity of the area through butterfly parks, medicinal plant gardens 3. Clearing of vegetation and trimming of trees in accordance with http://www.indianrailways.gov.in/railwayboard/uploads/directorate/civil_engg/downloads/acs_irpm/irwm.pdf page 172 clause715 4. Tree trimming/ felling permission from relevant authorities 5. Tree plantation in the ratio of 1: 3 i.e., 3 trees to be planted for 1 tree cut.	Contractor/ MR	Engineer's Representative	Before start of work	Permission to trim the tree branches & tree cutting will be obtained from Municipal Corporations/ ULBs /Tree authorities by contractor. A valid copy

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
						of NOC/ to be maintained by the contractor.
5	Site preparation	Before start of work the Contractor shall provide silt traps at required locations to avoid soil runoff during monsoon. Contractor shall prepare a construction schedule in such a way that earth work execution is avoided in monsoon.	Contractor	Engineer's Representative	Before start of work	Visual inspection records
6	Impact on Livelihood	<ol style="list-style-type: none"> 1. Relocation of shops only after new facilities are ready. 2. The affected persons losing livelihood will be assisted to improve or at least restore their income levels to pre-project level as per the entitlement proposed. 3. Identify Suitable income restoration schemes and implement. 4. Provide employment opportunities to the affected persons during the construction phase by facilitating their engagement by the civil works contractor. 	MRVC	Engineer Representative	Pre-construction period	Records
7	Existence of Hutments and Encroachment issue	<ol style="list-style-type: none"> 1. 15-day notice before start of work. 2. Provide compensation to affected PAFs as per the proposed entitlement before start of work 3. Ensure the appropriate EMPs are implemented to minimize the environmental impacts due to project activities. 	Contractor/ MRVC	MMRDA	Pre-construction period	Records
8	Differential impacts on vulnerable and	<ol style="list-style-type: none"> 1. 15 days advance notice through poster and leaflet before start of work. 2. Impacted vulnerable and disadvantaged population will be treated case by case basis by provision of assistance as given in RP. 	Contractor/ MRVC	MMRDA	Pre-construction period	Records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	disadvantaged population					
Construction Phase: Environment Management Plan (EMP)						
9	Transport of materials to site Movement of construction machinery/ vehicles Parking of construction vehicles	1. During transportation of materials to construction site, vehicles engaged by the Contractor shall comply with Safety requirements and operate on the road network enroute to site without causing nuisance/ disturbance 2. Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered 3. It is recommended to transport the material during night-time (10 pm to 5 am) and the prior permissions from the concerned department should also be obtained. This should be included as part of the Contract conditions to be signed with the Contractor. (Refer Appendix I Traffic Management Plan for details)	Contractor	Engineer's Representative	Random checks. Maintain accident / incident records.	Maintaining accident or incident records and Visual inspection records
10	Rail traffic management	Ensure safety of rail commuters near stacking yard and construction and fabrication sites Ensure safety while transferring construction material at construction site within rail premises. Obtain permission from DRM. (Divisional Railway Manager) for power and/or operation blocks.	Contractor	Engineer's Representative	Random checks. Maintain accident / incident records	Maintaining accident or incident records and visual inspection Records.

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
11	Historical and Cultural Monuments	<p>If there are any chance finds of archaeological or heritage value is discovered during excavation done for the purpose of construction. This will be deal as per the Article 23 of The Ancient Monuments and Archaeological sites and Remains Act, 1958 amended in 2010 covers procedure to deal with antiquities discovered during archaeological excavations. However, chance finds discovered during excavation for other purposes are to be dealt in accordance with Indian Treasure Trove Act, 1878, modified up to the 1st of September 1949. Treasure is defined as “anything of any value hidden in the soil, or in anything affixed thereto”.</p> <p>The steps involved in dealing with chance finds are as follows:</p> <ol style="list-style-type: none"> Notice by finder of treasure to Collector Notification by Collector requiring claimants to appear When treasure may be declared ownerless, such treasure shall either be delivered to the finder or be divided between him and the owner of the place in which it has been found. When no other person claims as owner of place, treasure to be given to finder. The Collector, may, at any time before delivering or dividing the treasure declare his intention to acquire on behalf of the Government the treasure or any specified portion thereof, by payment to the persons entitled thereto and thereupon such treasure or portion shall be deemed to the property of the Government. Decision of Collector is final. 	Contractor	Engineer’s Representative	Random checks. Maintain records	Maintaining records and visual inspection Records
12	Protection of Air quality monitoring Impact on air quality due to:	<p>The air quality management plan mentioned below to be followed during construction at all locations.</p> <ol style="list-style-type: none"> Contractor’s transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. Vehicular pollution checks for all the vehicles used during construction, operation and inspection shall be made mandatory. The excavated material shall be stored properly so that it does not generate fugitive emissions. Location of storage areas should be 	Contractor	Engineer’s Representative	Suitable as per construction Needs Air quality monitoring	Contractor will maintain following records: 1. Air quality monitoring record,

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	<p>1. Fugitive dust emissions in atmosphere</p> <p>2. Dust and Gaseous emission from heavy machinery and vehicles</p> <p>3. Emissions from diesel DG sets</p>	<p>selected such that it is downwind of the habitation area and also there is no runoff from the storage site during monsoon.</p> <p>4. Water sprinkling at the construction site as per requirement.</p> <p>5. Onsite vehicle speeds should be reduced to 10 kmph or less.</p> <p>6. Vehicles carrying construction material shall be covered to avoid spilling.</p> <p>7. Every day the haul road at the construction site shall be inspected and the debris left by the tractor - trolleys shall be removed as early as possible.</p> <p>8. Concrete batching plant should be located at or near the project site so that the requirement of transit mixers/ delivery trucks is minimized.</p> <p>9. Operation time of construction machinery should be optimized through modifications in the work schedule.</p> <p>10. As soon as the construction activity is over the surplus earth should be utilized to fill up the low-lying areas, if any.</p> <p>11. All stationary machines / DG sets emitting the pollutants shall be inspected weekly for maintenance and should be fitted with exhaust pollution control devices.</p> <p>12. After clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil shall be treated immediately by watering or re-vegetation or spreading soil binders to minimize dust generation until the area is paved or otherwise developed so that dust generation will be minimized.</p> <p>13. Grading and scraping operations shall be suspended when necessary to minimize dust generation.</p> <p>14. All roadways, driveways, and sidewalks associated with construction activities should be paved as soon as possible.</p> <p>15. The work schedule and the operation time of construction machinery should be suitably modified and have limited construction activity to exercise a control on ambient air quality standards.</p> <p>16. Stockpiling of the construction material and wet spraying of the</p>			<p>schedule is provided in Appendix II.</p>	<p>Vehicle test certificates.</p> <p>2. Visual records and checklists,</p> <p>3. Safety checklist,</p> <p>4. Equipment maintenance records</p> <p>5. PUC certificates</p>

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		<p>stockpile to prevent fugitive emissions should be ensured by the Contractor. During construction, the amount of disturbed area shall be minimized.</p> <p>17. Earthworks shall be sprayed with water during and after compaction of the sub-grade to prevent dust generation wherever practical.</p> <p>18. All the machinery and equipment shall be regularly maintained.</p> <p>19. It is recommended to transport the material during night-time (10 pm to 5 am) and the prior permissions from the concerned department should also be obtained. This should be included as part of the Contract conditions to be signed with the Contractor.</p> <p>20. Air quality monitoring for the same parameters, which were monitored during the Environment Impact (EA) studies, shall be monitored by the Contractor by hiring the services of the NABL accredited laboratory. MRVC will monitor that the AAQ monitoring program and air pollution control are scrupulously implemented. Air quality during construction phase will be monitored to ensure that the construction activity does not have adverse impact on environment. (Refer Appendix II for monitoring location details and frequency).</p> <p>21. DG sets shall be CPCB compliant.</p> <p>22. An appropriate sampling port location must be ensured in DG sets as prescribed in Emission Standards notified by MOEF&CC, 2013.</p> <p>23. Low sulphur diesel should be used in DG sets as well as machineries.</p> <p>24. Air pollutant emissions are regulated under Central Motor Vehicles Rules, all vehicles to comply with this requirement.</p> <p>25. A Separate or master register of vehicle's shall be maintained at construction site office containing details of vehicles under deployment and a copy of PUC certificates.</p>				
13	Protection of water quality	<p>The water quality management plan mentioned below to be followed during construction at all locations wherever applicable:</p> <p>1. The contractor shall arrange for water required for construction in such a way that the water availability and supply to nearby communities</p>	Contractor	Engineer's representative	Suitable as per construction	Maintenance of daily water consumption

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	Excessive water withdrawal/ consumption from ground and surface water sources during construction period Water stagnation and creation of temporary breeding habitats for mosquito /other vectors of disease Impact on existing storm	<p>remain unaffected</p> <p>2. Fumigation and spraying of anti-mosquito breeding pesticides should be carried out to control the vectors in the nearby water bodies and on regular basis by the Contractor. Periodic removal of aquatic weed which gives shelter to vectors should be carried out by the Contractor to control the water borne or the vector diseases.</p> <p>3. The drains should be maintained on regular basis to avoid waterlogging or flooding.</p>			Needs Water consumption details-daily	n records along with source by contractor Maintenance of Records of frequency of storm water drain cleaning where applicable

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	water management					
	Vibration	<ol style="list-style-type: none"> 1. Route heavily loaded trucks away from residential and sensitive areas. 2. Construction activities shall be scheduled such that demolition, earthmoving and ground-impacting operations do not occur in the same time period. 3. Avoid nighttime construction activities. 	Contractor	Engineer's Representative	Suitable as per construction Needs	Maintenance of records
14	Noise Levels <ol style="list-style-type: none"> 1. Noise and vibrations due to Metal Fabrication and assembling etc. 2. Noise & Vibration due to diesel DG 	<p>The noise levels management plan mentioned below to be followed during construction at all locations:</p> <ol style="list-style-type: none"> 1. Noise levels at construction sites shall be compliant with Environment (Protection) Rules, 1986 (Schedule VI, Part E) the noise generation standards applicable for construction equipment, machinery, and vehicles. http://cpcb.nic.in/GeneralStandards.pdf 2. All construction equipment and machinery shall be timely serviced and properly maintained to minimize its operational noise and equipment shall comply with occupational safety and health standards. 3. Construction activity and timing shall be regulated to minimize the intensity of the noise impact. 4. Construct walled enclosures around especially noisy activities or clusters of noisy equipment. 5. Construct noise barriers, such as temporary walls or piles of excavated materials between noisy activities and noise receivers. 6. Strategic placement of stationary equipment, such as compressors and generators. 7. Scheduling work to avoid simultaneous activities that generates high noise levels 8. For protection of construction workers, earplugs should be provided to those workers who will be working very close to noise generation 	Contractor	Engineer's Representative	Noise level monitoring schedule is provided in Appendix II .	Maintenance of records of Noise monitoring reports during construction phase to be maintained by contractor Vehicle maintenance records to be maintained as per construction needs

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	sets 3. Increase in Noise level due to construction activity, machinery movement	source. 9. Job rotation of construction workers 10. Use of hydraulic tools instead of pneumatic tools, 11. Use of electric equipment instead of diesel-powered equipment. 12. Construction equipment and machinery shall be fitted with silencers or isolated using acoustic medium wherever possible 13. Metal Fabrication and assembling activities should be carried out in area where nearby there are no settlements 14. Use of DG sets shall be kept minimum. 15. The DG sets and other construction equipment and machinery should be fitted with acoustic enclosures and a routine maintenance of the DG sets and other construction equipment's should be carried out to control the noise levels from these sources. 16. Noise levels during construction phase at locations which were monitored during the Environment Impact (EA) studies, shall be monitored by the Contractor by hiring the services of the NABL accredited laboratory. MRVC will monitor that the Noise monitoring program and noise abatement measures are scrupulously implemented. Noise levels during construction phase will be monitored to ensure that the construction activity does not have adverse impact on environment. (Refer Appendix II for monitoring location details and frequency).				
15	Land /Soil /Water contamination	1. On completion of the construction activity, all the unpaved area shall be covered with vegetation, which will reduce soil erosion. 2. Compaction and stabilization during filling in such a way that no loose soil is washed away with runoff during rains. Silt traps can be used to confine the soil erosion. 3. Used oil shall be collected and stored in leak proof drums and sent for recycling. The used oil drums shall be properly identified with a label in local language and in English. 4. Good housekeeping. 5. Restoration of the open places to original after completion of	Contractor	Engineer's Representative	Monthly	Visual inspection record Operating procedures, Safety check list, Visual inspection of soil.

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		<p>construction activities.</p> <p>6. Regular maintenance and inspection of equipment and vehicles for damaged hoses, leaky gaskets, and other service problems. Care shall be taken to prevent any oil spill during fueling of construction machinery, vehicles.</p> <p>7. No equipment washing shall be done at construction site</p> <p>8. Temporary cement/metal platform will be provided below the construction machineries and at maintenance site to capture the spill. These platforms should be at sufficient height to avoid the littering.</p> <p>9. Conducting routine inspections to ensure proper functioning.</p> <p>10. Runoff water from project site should not enter into nearby water bodies. If required, sandbags shall be used to control the flow path of runoff from the construction site by diverting runoff around areas prone to erosion, such as steep slopes.</p> <p>11. Oil and grease removal trap will be provided in the storm water collection system.</p> <p>12. Excavation will not be carried out during monsoon.</p> <p>13. Fuel and lubricants should be stored at the predefined storage location to be identified by the Contractor in consultation with MRVC. The storage area should be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils.</p> <p>14. All efforts should be made to minimize the hazardous waste generation. Unavoidable hazardous waste shall be stored at the designated place prior to disposal in the nearest Common Hazardous Waste Treatment Storage and Disposal Facility (CHWTSDF).</p> <p>15. The Hazardous waste management should be handled by authorized/licensed agent as per guidelines of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 & its amendments.</p> <p>16. Storing of fuel and lubricants shall be on an impervious flooring of at least 6" thick brick/ PCC work lined with polyethylene sheet.</p>				

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		Lubricating/oiling equipment installations, fuel/ oil/ lubricant storage areas etc shall be avoided Wherever there is chance of oil spill secondary containment shall be used. If leaks and spills are unavoidable from stationary equipment, layer of dry sawdust or other organic absorbent material shall be provided to prevent contamination of ground. All efforts shall be made to protect the surface water and soil from the spillages.				
16	Compliance to road safety rules	<ol style="list-style-type: none"> 1. The driver should be trained in traffic rules, safer/ defensive driving practice, road courtesies etc. 2. Drivers will have valid driving licenses Road transportation 3. Vehicles should not be loaded with bulk materials beyond the safe clearance 4. Vehicles will have speed restrictions. 	Contractor	Engineer's Representative	Monthly / Random checks	Maintenance of incident or accident record Incident data/ report from traffic police Copy of driving licenses.
17	Transportation and storage of fine materials	<ol style="list-style-type: none"> 1. Storage of material will be mainly at major construction site 2. The excavated material shall be stored properly so that it does not generate fugitive emissions. Location of storage areas should be selected such that it is downwind of the habitation area and also there is no runoff from the storage site during monsoon. 3. Tarpaulin/ Equivalent covering sheets shall be provided while transporting fine material such as cement/sand. Regular sprinkling of water on the surface of material stock to prevent dust generation due to storage and handling. 	Contractor	Engineer's Representative	Weekly/ Random checks	Visual inspection. Maintenance of Record of the transport vehicles Records of water sprinkling details
18	Condition of	<ol style="list-style-type: none"> 1. All equipment/ vehicles should be kept in good state of repairs 2. All vehicles registered under Central Motor Vehicle Act 	Contractor	Engineer's Representative	Quarterly	Maintenance of

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	construction vehicles	3. There will be no excessive idling of construction vehicles at sites Rules, 2000 shall have valid truck certificate issued by authorized agency throughout their deployment period at construction site. 4. All equipment and machineries to be used shall comply with the design safety. 5. All equipment and machineries shall be inspected and certified by competent person. 6. All equipment and machineries shall comply with industrial standards. 7. Preventive maintenance and servicing of equipment and machineries should be done to avoid any incident and breakdown. 8. Each and every machine and tools should be inspected by the operator and supervisor before start of work.		ative		equipment maintenance records
19	Excavation and construction work-Dust generation	1. Temporary watering for storage areas for bulk materials and construction waste at dry and windy weather shall be provided. 2. Loading-unloading activity shall not be frequent 3. During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site. 4. There will be no open burning of construction / waste material at the site.	Contractor	Engineer's Representative	Monthly	Maintenance of Visual inspection records. Operating procedures Safety check list
20	Construction and demolition (C&D) debris	1. Before excavation, the Contractor will be required to conduct TCLP test for the soil quality including heavy metals and the results will be compared with standards. If the soil is contaminated, disposal will be done with due treatment or isolation of such muck. 2. Contractor will handle the waste as per Construction and Demolition Waste Management Rules, 2016. C&D waste generated from construction has potential use after processing, grading solid waste and recycling. 3. All generated C& D waste shall be collected at designated place; segregate into soil, inert material as concrete, bricks, mortar, and	Contractor	Engineer's representative	Monthly	Maintenance of records of permission for disposal of C&D waste, and disposal records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		recyclables as plastic, steel etc. 4. Inorganic solid waste generated during the construction phase like waste concrete, and mortar, left over aggregate and debris etc. shall be recycled for use in the base layers of paved area i.e., parking pavement or in road construction or in filling the low laying areas. 5. The soil will be stacked and use for landscaping, recyclable will be sold to recyclers, and other C&D waste handover to authorized recycler for construction and demolition waste processing facilities. 6. Identification of intended transport means and route. 7. Obtaining permission, where required, for treatment of the hazardous component and its disposal. 8. During interior demolition work above the first floor, debris chutes shall be used. 9. Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust 10. C&D waste will be cleared from the source of generation/ dumpsites and disposed of as per C&D Waste Management Rules on sites identified by Municipal Corporation/ ULBs by Contractor 11. Demolition and Desilting Waste (Management and Disposal) guidelines 2005 setup for Greater Mumbai may be followed in order to recycle the debris as much as possible. 12. The muck shall be filled in the dumping site in layers and compacted mechanically. Once the filling is complete, the entire muck disposal area shall be provided with a layer of good earth on the top and covered with vegetation.				
21	Site Requirements - Labour Welfare	1. All the facilities as per Building and Other Construction Workers Act, 1996(BOCWA) will be provided. In addition to BOCWA Act, separate toilet facilities for women workers should be provided. 2. As far as possible the construction labor will not be staying at site/ near construction area. 3. However, depending upon the location of work and number of workers	Contractor	Engineer's representative	At start of work & Monthly thereafter	Visual inspection, Records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		<p>Contractor shall make alternate arrangements for providing water for drinking and sanitation facilities.</p> <p>4. If there are construction camps, the contractor shall provide, erect and maintain necessary temporary living accommodation and ancillary facilities such as toilet blocks, potable water supply, canteen etc. as per standards set by various acts (Labor Act 1951), Contract Labour Act 1970, Construction Worker Act 1996, Construction Workers Rules 1998, as applicable.</p>				
22	Likelihood of spread of HIV/AIDS among construction workers and roadside community	<ol style="list-style-type: none"> 1. Coordinate with Maharashtra State AIDS Control Society to collect dissemination materials. 2. Awareness and training to labour and community on HIV/AIDS and STDs 3. Community based meetings, consultations in camp, distribution of leaflet, IEC communication, poster, and banners. 4. Programme convergence with State AIDSS Control Society. 	Contractor	Engineer's representative	At start of work	Maintenance of records
23	Gender Issue	<ol style="list-style-type: none"> 1. Ensure safe lighting at workplace and worker's colony along with separate access to female/male toilets if women workforce deployed at site. 2. First aid medical facilities at the working site for pregnant women, elderly women, and children. 3. Ensure that women workforce are paid at par with male workers. 4. Ensure adherence to provision of labour law. 5. If women workers are deployed at sites, then day crèche facilities shall be provided to facilitate the women with infants working on site. 	Contractor	Engineer's representative	At start of work & Monthly thereafter	Visual inspection, Records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		6. Also address the aspirations and concerns of the women amongst the PAP community.				
24	Occupational Health and Safety of workers and commuters during construction	<p>The building and other construction workers’ (regulation of employment and conditions of service) act, 1996 requires that</p> <ol style="list-style-type: none"> a) No child labor should be involved in any of the activities b) Only competent person should allow on heavy work. c) All equipment’s and machinery shall be inspected before starting the work and all are certified by the competent person. d) Every worker should be provided training related to job safety and other hazards related to job. e) Periodical medical checkups shall be organized for workers. f) Each worker shall be given personal protective equipment (PPE) which is mandatory to use while working. g) Each incident should be reported so that preventive measure can be taken to avoid reoccurrence of such incident. h) All hazardous chemicals and materials shall be stored in dedicated area and covered. Signboard and labelling should be done. Also, every chemical shall have material safety data sheet (MSDS). <ol style="list-style-type: none"> 1. The stakeholders shall be notified of upcoming activities by displaying the boards containing project details, construction areas, period of construction, alternate routes if any to be followed during construction activity. 2. Contractor will obtain necessary permits for performing dangerous operations like high voltage electrical work and install permit system for the workers. 3. All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. 4. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, earplugs (wherever applicable), masks etc. 	Contractor	Engineer’s representative	Weekly checks	Visual inspection, Maintenance of Records Compliance with The building and other construction workers’ (regulation of employment and conditions of service) act, 1996. As well as filled permits and safety inspection reports

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		<p>to the construction workers and staff. (Contract as well as permanent staff)</p> <p>5. PPE used by construction workers shall comply with international good practice.</p> <p>6. The contractor will be required to appoint a safety officer who will conduct regular safety inspections at construction sites</p> <p>7. Contractor will ensure good health and hygiene of all workers to prevent sickness and epidemics and shall also provide First aid unit in case of emergency</p> <p>8. In any accident happens, root cause analysis should be done, and the incident report should be submitted to AIIB within 2 days.</p> <p>9. All efforts to be taken to ensure safety of during construction activity by barricading the area, early communication regarding construction activity (date, time/ period and alternate routes) to be communicated (Refer to the Commuter Management Plan Appendix-III)</p>				
25	Environmental Health and Safety	<p>1. First aid facilities shall be provided to the labor at the construction camp/ construction sites.</p> <p>2. Suitable transport will be provided to facilitate take injured or ill person(s) to the nearest approachable hospital.</p> <p>3. The site medical room should display awareness posters on safety facilitation hygiene and HIV/AIDS awareness.</p> <p>4. First Aid Box will be provided at every construction site and under the charge of a responsible person who shall always be readily available during working hours. He shall be adequately trained in administering first aid-treatment. Formal arrangement shall be prescribed to carry injured person or person suddenly taken ill to the nearest hospital. The first aid box shall contain the following.</p> <ul style="list-style-type: none"> • small, sterilized dressings • medium size sterilized dressings • large size sterilized dressings 	Contractor	Engineer's representative	Weekly checks	Maintenance of Inspection reports. Contractor will be required to appoint an Accident Prevention Officer (APO) who will conduct regular safety inspections

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		<ul style="list-style-type: none"> • large, sterilized burns dressings • 1 (30 ml) bottle containing 2 % alcoholic solution of iodine • 1 (30 ml) bottle containing salvolatile • 1 snakebite lancet • 1 (30 gms) bottle of potassium permanganate crystals • 1 pair scissors • Ointment for burns • A bottle of suitable surgical antiseptic solution In case, the number of labor exceeds 50, the items in the first aid box shall be doubled. <p>Labour Act 1951, Railway Guidelines shall be complied with for first aid facilities.</p> <p>For details refer Safety, Health and Environment (SHE) Management Plan-Appendix IV</p>				at construction sites. The APO will have the authority to issue instructions and take protective measures to prevent accidents
26	Closure of construction activity	<ol style="list-style-type: none"> 1. At the completion of construction, all temporary facilities provided for construction workers shall be dismantled and removed from the site. The site shall be restored to a condition in no way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include: <ol style="list-style-type: none"> a) Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas. b) Soak pits, septic tanks shall be covered and effectively sealed off. c) Debris (rejected material) should be disposed off suitably d) Ramps created should be leveled 2. Proper documentation of rehabilitation site is necessary. This shall include the following: <ol style="list-style-type: none"> a) Photograph of rehabilitated site; b) Landowner consent letter for satisfaction in measures taken for rehabilitation of site; <p>Undertaking from contractor that the site is closed as per the requirement</p>	Contractor	Engineer's representative	Weekly	Records, Photograph
27	Disposal	<ol style="list-style-type: none"> 1. Solid waste will be sampled and analyzed so that it can be classified as 	Contractor	Engineer's	As per	Maintaining

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
	of solid and hazardous material	C&D/ Hazardous/ Municipal solid waste. 2. In case of Municipal solid waste, it will be disposed of in accordance with Municipal Solid Waste Management Rules on sites identified by Municipal Corporation/ ULBs by contractor. 3. If waste asbestos is generated, waste asbestos handling and disposal shall be in line with World Bank requirements and requirements of Ministry of Environment, Forest and Climate Change. Hazardous Waste (Management, Handling & Trans boundary Movement) Rules, 2008 4. All efforts should be made to minimize the hazardous waste generation. Unavoidable hazardous waste such as waste oil shall be stored at the designated place prior to disposal in the nearest Common Hazardous Waste Treatment Storage and Disposal Facility (CHWTSDF). Refer Appendix V- Asbestos Management Plan for more details		representative	regulation	records of waste analysis already dumped at construction site Maintaining hazardous waste inventory and inventory of solid waste and C&D waste Maintaining Hazardous waste manifests System records
28	Communication and Training	1. Communication protocol with stakeholders will be developed for smooth and operation phase thus same to be submitted to MRVC/ Engineer's representative before commencement of work as a first step. The contractor must also follow it during occupation of site. 2. Environmental Monitoring Plan (Appendix II) 3. Grievance redressal mechanism cell will be formed, and the details will be available on MRVC website. For details refer Appendix VI 4. Training and awareness will be created to have safe construction activities and to handle any emergency due to construction work	Contractor	Engineer's representative	Weekly	Contractor to maintain the Training Records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
		5. Training is provided 2 times in a year.				
29	Signage to increase awareness regarding trespassing	Signage and displays will be created at suitable locations at high walks, FOB and track barricades to spread awareness regarding hazards of trespassing. This will help more people to use the facilities created for preventing the trespassing.	Contractor	Engineer's representative in construction phase and Concerned department of central/western railway during operation phase	Initial inspection and periodic checks	Visual records
30	Sustainable water/energy source	The measures also green initiatives such as maximum use of natural light at the facilities, energy saving and efficient lightings and renewable energy sources such as use of solar panel for buildings.	Contractor	Engineer's representative in construction phase and Concerned department of central/Western railway during operation	Initial inspection and periodic checks	Visual records

S. No.	Environmental Issues	Mitigation Measures	Responsibility		Supervision Frequency	Performance Indicator
			Implementation	Supervision		
				phase		

Note:

- 1) The cost of monitoring of Air, Noise, Water and Soil quality as required by regulations is to be included in the quoted price and will be at no extra cost to the client.
- 2) The contractor will comply with the contract agreement and ESMP.
- 3) The links are provided for quick reference to the rules and may be indicative. It is responsibility of Contractor to refer and comply to the latest amendments of rules and regulations.

CHAPTER 7. Occupational Health and Safety

The impact on occupational health and safety during the construction phase is anticipated to be of insignificance, as the construction of FOB and other activities will be done through experienced and trained workers. Proactive mitigation measures have been detailed in next chapter.

7.1 Labour Welfare

Facilities such as shelter at workplace, canteen, first aid and day crèche are statutory requirement and essential to productivity. All the facilities as per Building and Other Construction Workers Act, 1996 (BOCWA) will be provided. In addition to BOCWA Act, separate toilet facilities for women workers should be provided.

7.2 Impacts due to Project Operation

7.2.1 NOISE AND VIBRATION IMPACT

There is no impact of noise and vibration during operation is anticipated as no noise and vibration producing equipment or machineries will be used during operation.

7.2.2 ENERGY DEMAND

Requirement of electrical energy for climate control, lighting, passenger information, escalators, lift and other facilities at stations shall be optimized by proper use of natural day/night light and design of passenger flow inside stations and on streets outside stations.

The proposed development of identified stations including planning, designing & construction of all structures shall be done as per Indian Green Building Council (IGBC) norms. In accordance with the GRIHA (version 2015) norms as described above in Green Building section.

7.2.3 EMPLOYMENT OPPORTUNITIES

During construction local skilled and unskilled labourers will have an opportunity for employment directly or indirectly. Approximately 570 persons are likely to work during project construction. Thus, the project would provide substantial direct employment; besides, more people would be indirectly employed in allied activities and trades. MRVC will ensure equal opportunity for women during construction of project.

7.2.4 IMPROVED INFRASTRUCTURE

The improvement proposed in this project at 17 identified stations will substantially increase station's quality of service, in terms of comfort, facilities and pedestrian mobility through following:

- Increase Size of Platform Platforms:
- Increase Concourse Space
- Increase Staircase Width and Additional Staircase
- Escalator/Lifts:
- Signage's & Indicators:
- Facilities for Person with Disability
- Passenger Amenities
- Increase Number of Ticket Counters
- Increase Waiting Area

7.3 Occupational Health and Safety (OHS) Annexure

7.3.1 A PHYSICAL FITNESS OF WORKMEN

- The contractor shall ensure that his employees / workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.
- The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drug.

7.3.2 MEDICAL FACILITIES

Medical Examination

- a. The contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.
- b. No construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such worker.
- c. The medical examination shall include:
 - i. Full medical and occupational history.
 - ii. Clinical examination with particular reference to
 - i. General physique;
 - ii. Vision: Total visual performance using standard Orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.

- iii. Hearing: Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv. Audiometry test for workers I employees having complaint; otherwise at random for those who are exposed to high noise level.
 - v. Breathing: Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre- placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - vi. Lung function test for workers I employees having complaint; otherwise at random for those who are exposed to high noise level.
 - vii. Upper Limbs: Adequate arm function and grip.
 - viii. Spine: Adequately flexible for the job concerned.
 - ix. Lower Limbs: Adequate leg and foot concerned.
 - x. General: Mental alertness and stability with good eye, hand and foot coordination.
- iii. Any other tests which the examining doctor considers necessary

If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges

Occupational Health Centre:

The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down in of the BOCWR. A construction medical officer appointed in an occupational health centre possess the qualification as laid down in the BOCWR.

Ambulance van and r oom:

The contractor shall ensure at a construction site of a construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in the BOCWR.

First-aid box:

The contractor shall ensure at a construction at a one First-aid box for 100 workers provided and maintained for providing First-aid to the workers. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in the BOCWR.

HIV/AIDS prevention and control:

- The contractor shall adopt the Employer's Policy on "HIV/AIDS Prevention and Control for Workmen Engaged by Contractors" and the copy of the policy is given in Appendix No. 4.
- The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.
- The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.
- The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers' workplace policy on HIV/AIDS for workmen of the Contractors.
- As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers' appointed agency for the purpose.
- The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen throughout the contract period.
- The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.
- The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.
- In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.
- It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.

Prevention of mosquito breeding:

Measures shall be taken to prevent breeding at site. The measures to be taken shall include:

- i. Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
- ii. Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
- iii. Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
- iv. Water storage tanks shall be provided.

Posters in both Marathi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.

The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides.

Alcohol and drugs:

Consumption of alcoholic drink and banned drugs by any work man/ woman at work site is strictly prohibited and this is punishable as per Government regulations. The contractor shall ensure the same. Contractor shall carry out breathing analyser test for presence of alcohol on the workers at random, time to time.

Smoking at public worksites by any employee is also prohibited as per Govt. Regulations.

7.3.3 NOISE

The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub-contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals or premises with similar sensitivity to noise.

Without prejudice to the generality of the foregoing, noise level reduction measures shall include the followings:

- i. The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.

- ii. The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.

The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the BOCWR or project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer, in the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.

The noise monitoring requirements including monitoring locations are given in the project SHE Manual.

Control Requirements:

Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:

1. Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.
2. Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any Unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
3. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.
4. The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
5. The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and updated as necessary to

assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

Dust Control and Silicosis Exposure Reduction Strategy:

The Contractor shall ensure proper dust handling at work site as described in the project specific Environment Management Plan and follow Silicosis Exposure Reduction Strategy as described at Annexure-I at the end of this document.

Occupational Noise:

- i. Protection against the effects of occupational noise exposure should be provided when the sound levels exceed the threshold values as provided in Project, SHE Manual.
- ii. When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and Project SHE Manual.
- iii. If such controls fail to reduce sound levels within the levels of the table, Personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- iv. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computation as given in project SHE Manual.

Vibration Level:

In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such historical/ heritage sites shall be submitted to Employer for his approval. This scheme shall include:

- i. Monitoring requirements for vibrations at regular intervals throughout the construction period.
- ii. Pre-construction structural integrity inspections of historic and sensitive structures in project activity.
- iii. Information dissemination about the construction method, probable effects, Quality control measures and precautions to be used.
- iv. The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in EA report of the project.

7.3.4 VENTILATION AND ILLUMINATION

Ventilation:

- i. The contractor shall ensure at a construction site of a construction work that all working areas are provided with ventilation system as approved by the DG/CIIBC and the fresh air supply in such tunnel is not less than 6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9 m/min.
- ii. The oxygen level shall not be less than 19.5% in the working environment.

Illumination:

- i. The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated.
- ii. The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.

7.3.5 RADIATION

- i. The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all subsidiary legislation.
- ii. Operations involving ionizing radiation shall only be carried out after having been reviewed without objection by the Employer's representative and shall be carried out in accordance with a method statement.
- iii. Each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.
- iv. Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.
- v. The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

7.3.6 WELFARE MEASURES FOR WORKERS

Latrine and Urinal Accommodation:

- i. The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 5 workers. In addition, one urinal accommodation shall be provided for every 100 workers.
- ii. When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.

- iii. Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per relevant Rule of BOCWR and shall also comply with the requirements of public health authorities.

Moving sites:

In case of works like track laying, the zone of work is constantly moving at elevated level or at ground level. In such cases mobile urinals with proper facility to drain the sullage shall be provided at reasonably accessible distance.

Canteen:

In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, BOCWR and as stipulated in relevant of BOCWR the Charges for food stuff shall be based on 'no profit no loss' basis. The price list of all times shall be conspicuously displayed in such canteen.

Serving of tea and snacks at the workplace:

As per BOCWR, at construction work where a workplace is situated at a distance of more than 200m from the canteen provided under relevant Rule of BOCWR the contractor employing works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.

Drinking water:

- i. As per Section 32 of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water. Quality of the drinking water shall conform to the requirements of national standards on Public Health.
- ii. While locating these drinking water facilities due care shall be taken so that these are easily accessible within a distance of 200 m from the place of work for all workers at all location of work sites.
- iii. All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place and such point shall be situated within six metres of any washing places, urinals or latrines.

SAFETY

7.4 Housekeeping

- Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defense against accidents and injuries.

- Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed "Cleanliness is indeed next to Godliness"
- Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- General Housekeeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour camp, Stores, Offices and toilets/urinals. Toward this the Contractor shall constitute a special group of housekeeping personnel. This group shall ensure daily cleaning at work site & surrounding areas and maintain a register in a format approved by the Employer.
- Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad.
- The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc. which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- The structure dimension of the barricade, material and composition, its colour scheme. MRVC logo and other details shall be in accordance with specifications laid down in tender document.
- All emergency exits passageways, exits fire doors, break-glass alarm points, firefighting equipment, first Aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.
- Lumber with protruding nails shall be either bent! removed and properly stacked. All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving. The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.
- No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

- Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic. Similarly, if work site is on adjacent railway tracks, no obstruction shall be allowed on existing railway tracks.
- Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the contractor shall be penalized as per relevant clause.
- Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored/stacked in an orderly and safe manner.
- Flammable chemicals/compressed gas cylinders shall be safely stored. Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- Empty cement bags and other packaging material shall be properly stacked and removed.
- The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to housekeeping.

7.5 Working at Height

7.5.1 DEFINITIONS

1. 'access' and 'egress' include ascent and descent.
2. 'fragile surface' means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.
3. 'line' includes rope, chain or webbing
4. 'personal fall protection' means-
 - a. A fall prevention, work restraint, work positioning, safety belt, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or
 - b. rope access and positioning techniques;
5. 'work at height' means-
 - a. work in any place, including a place at or below ground level;
 - b. obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace, where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;

6. 'work equipment' means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes
 - a. a guard-rail, toe-board, barrier or similar collective means of protection
 - b. a working platform
 - c. a net, airbag or other collective safe guard for arresting falls.
 - d. personal fall protection system
 - e. ladders
7. 'working platform'
 - a. means any platform used as a place of work or as a means of access to or egress from a place of work;
 - b. includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway, which is so used.
8. Organization and planning:

The contractor shall ensure that work at height is

 - i. properly planned for any emergencies and rescue
 - ii. appropriately supervised; and
 - iii. carried out in a manner, which is reasonably practicable safe.

The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work.

7.5.2 COMPETENCE

The contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.

7.5.3 AVOIDANCE OF RISKS FROM WORK AT HEIGHT

The contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.

7.5.4 WHERE WORK IS CARRIED OUT AT HEIGHT, THE CONTRACTOR SHALL TAKE SUITABLE AND SUFFICIENT MEASURES AS GIVEN BELOW TO PREVENT, SO FAR AS IS REASONABLY PRACTICABLE, ANY PERSON FALLING A DISTANCE LIABLE TO CAUSE PERSONAL INJURY.

- a. his ensuring that the works carried out
 - i. from an existing place of work; or
 - ii. in the case of obtaining access or egress) using an existing means, complying to the requirements as given in 18.15

Where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

- b. where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.

7.5.5 WHERE THE MEASURES TAKEN UNDER CLAUSE 18.6 DO NOT ELIMINATE THE RISK OF A FALL OCCURRING, EVERY CONTRACTOR SHALL

- a. so far as is reasonably practicable, provide sufficient work equipment to minimize-
 - i. the distance and consequences; or
 - ii. where it is not reasonably practicable to minimize the distance, the consequences, of fall; and
- b. Without prejudice to the generality of clause 18.4, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

7.5.6 SELECTION OF WORK EQUIPMENT FOR WORK AT HEIGHT

1. The contractor, in selecting work equipment for use in work at height, shall
 - a. give collective protection measures priority over personal protection measures; and
 - b. take account of
 - i. the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
 - ii. in the case of work equipment for access and egress, the distance to be negotiated;
 - iii. the distance and consequences of a potential fall;
 - iv. the duration and frequency of use;
 - v. the need for easy and timely evacuation and rescue in an emergency; and
 - vi. any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
2. The contractor shall select work equipment for work at height which;
 - a. has characteristic including dimensions which;
 - i. are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 - ii. allow passage without risk; and

- b. is in other respects the most suitable work equipment, having regard in particular to the purposes specified in 18.5 and 18.6

7.5.7 FRAGILE SURFACES

The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so. Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on, from or near, a fragile surface, every contractor shall,

- a. ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- b. where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimize the distances and consequences of his fall.

Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that

- a. prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
- b. where that is not reasonably practicable, such persons are made aware of it by other means.

7.5.8 FALLING OBJECTS

- a. The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.
- b. Where it is not reasonably practicable to comply with the requirements of every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.
- c. The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.
- d. Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.

7.5.9 DANGER AREAS

Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that

- a. where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work
 - i. falling a distance; or
 - ii. being struck by a falling object,which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorized persons from entering such area; and
- b. Such area is clearly indicated.

7.5.10 INSPECTION OF WORK EQUIPMENT

The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.

The contractor shall ensure that work equipment exposed to conditions causing deterioration, which is liable to result in dangerous situations, is inspected

- a. at suitable intervals; and
- b. each time that exceptional circumstances which are liable to jeopardize the safety of the work equipment have occurred.
to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

Without prejudice to paragraph 18.12.1, the contractor shall ensure that a working platform used for construction work; and from which a person could fall 2 meters or more, is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.

The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.

In this clause 'inspection'.

- a. means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;
- b. Includes any testing appropriate for those purposes.

7.5.11 INSPECTION OF PLACES OF WORK AT HEIGHT

The contractor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.

7.5.12 DUTIES OF PERSONS AT WORK

Any workmen employed by the contractor shall report to the supervisor about any defect relating to work at height, which he knows, is likely to endanger the safety of himself or another person.

Every workman shall use work equipment or safety device provided to him for work at height by the contractor, in accordance with

- a. any training
- b. in the use of the work equipment or device concerned which have been received by him; and
- c. the instructions respecting that use, which have been provided to him by the contractor as per the requirements of the Employer

7.5.13 REQUIREMENTS FOR EXISTING PLACES OF WORK AND MEANS OF ACCESS OR EGRESS AT HEIGHT

Every existing place of work or means of access or egress at height shall

- a. be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;
- b. where applicable, rest on a stable, sufficiently strong surface;
- c. be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
- d. possess suitable and sufficient means for preventing a fall;
- e. possess a surface, which has no gap
 - i. through which a person could fall;
 - ii. through which any material or object could fall and injure a person; or
 - iii. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;
- f. be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable –
 - i. the risk of slipping or tripping; or

- ii. any person being caught between it and any adjacent structure;
- g. where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

7.5.14 REQUIREMENTS FOR GUARDRAILS, TOE-BOARDS, BARRIERS AND SIMILAR COLLECTIVE MEANS OF PROTECTION

- i. Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.
- ii. Means of protection shall
 - a. be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
 - b. be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
 - c. be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.
- iii. In relation to work at height involved in construction work
 - a. the top guard-rail or other similar means of protection shall be at least 950 millimeters above the edge from which any person is liable to fall;
 - b. toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
 - c. any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimeters.
- iv. Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

7.5.15 REQUIREMENTS FOR ALL WORKING PLATFORMS

- i. Every working platform requires a supporting structure for holding it
- ii. Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.
- iii. Stability of supporting structure:
Any supporting structure shall
 - a. be suitable and of sufficient strength and rigidity for the purpose for
 - b. which it is being used;

- a. a note of the calculations, covering the structural arrangements contemplated, is available; or
 - b. it is assembled in conformity with a generally recognized standard configuration.
- viii.** Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
- ix.** A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled
- x.** The dimensions from the layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.
- xi.** While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.
- xii.** Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in
- a. understanding of the plan for the assembly, dismantling or alteration
 - b. of the scaffolding concerned;
 - c. safety during the assembly, dismantling or alteration of the scaffolding concerned;
 - d. measures to prevent the risk of persons, materials or objects falling;
 - e. safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
 - f. permissible loadings;
 - g. any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

7.5.16 REQUIREMENTS FOR COLLECTIVE SAFEGUARDS FOR ARRESTING FALL

- i. Collective safeguard are a safety net, airbag or other collective safeguard for arresting falls
- ii. A safeguard shall be used only if
 - a. a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - b. the use of other safer work equipment is not reasonably practicable and

shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.

- iv. Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system

7.5.18 REQUIREMENTS FOR LADDER

- i. Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - a. The short duration of use; or
 - b. Existing features on site, which he cannot alter.
- ii. Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- iii. Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- iv. A ladder shall be so positioned as to ensure its stability during use
- v. A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented.
- vi. A portable ladder shall be prevented from slipping during use by-
 - a. securing the stiles at or near their upper or lower ends;
 - b. an effective anti-slip or other effective stability device; or
 - c. any other arrangement of equivalent effectiveness.
- vii. A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
- viii. No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- ix. A mobile ladder shall be prevented from moving before it is stepped on.
- x. Where a ladder or run of ladders raises a vertical distance of 9 meters or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- xi. Every ladder shall be used in such a way that
 - a. a secure handhold and secure support are always available to the user; and
 - b. the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
 - i. the low risk; and

- ii. the short duration of use.

7.5.19 OVERHEAD PROTECTION

All contractors shall provide overhead protections as per relevant Rule of BOCWR

- i. Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- ii. Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- iii. Overhead protection shall not be erected more than a height of 5m from the base of the building.
- iv. Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the contractor

7.5.20 SLIPPING, TRIPPING, CUTTING, DROWNING AND FALLING HAZARDS

As per BOCWR,

- i. All places should be free from dust, debris or similar materials.
- ii. Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- iii. Contractor shall not allow workmen to work or use platforms, scaffolds! passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned of or covered or sanded or saw dusted or make it safe with any suitable material.
- iv. When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
- v. Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- vi. Suitable safety net shall be provided at places of material/man falling is possible in accordance with national standards.

7.5.21 LIFTING APPLIANCES AND GEAR

- a.** Lifting appliances means a crane, hoist machinery, derrick, winch, ginpole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, lofting machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eye nuts and other accessories of a lifting appliance.
- b.** No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:
 - i.** the weights, dimensions and lift radii of the heaviest and largest loads.
 - ii.** the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each.
 - iii.** the number and frequency of lifts to be made **iv.** how long the crane will be required on site
 - iv.** the type of lifting to be done (for example, is precision placement of loads important)
 - v.** the type of carrier required (this depends on ground conditions and machine
 - vi.** capacity in its operating quadrants; capacity is normally greatest over the rear, less over the side, and non-existent over the front
 - vii.** whether loads will have to be walked or carried
 - viii.** whether loads will have to be suspended for lengthy periods
 - ix.** the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation.
- c.** The contractor shall ensure that a valid certificate of fitness issued as per clause 21.7 is available for all lifting appliances including synchronized mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employers approval before inducting to the site. Only after obtaining the approval from the employer any lifting appliances and gear shall be used.
- d.** The laminated photocopies of fitness certificate issued by competent person, the Employers' approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.
- e.** All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.
- f.** The contractor shall also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.

- g.** Test and periodical examination of lifting appliances and gears:
- h.** All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested, examined and certified by a competent person registered with State Inspectorate of Factories once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability, within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done.
- i.** Contractors can utilize the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- j.** All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition.

7.5.22 AUTOMATIC SAFE LOAD INDICATORS

- a.** All lifting appliances and gears like cranes, hydras etc., if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of India standards/International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.
- b.** Qualification of operator of lifting appliances and of signaller etc.
- c.** The contractor shall not employ any person to drive or operate a lifting machine-like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he
 - i.** is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicle Act and Rules.
 - ii.** is absolutely competent and reliable
 - iii.** possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
 - iv.** is medically examined periodically as specified in the BOCW Rules.

7.5.23 GENERAL REQUIREMENTS OF APPLIANCES

- a.** Out-of-level
One of the most severe effects of being out of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore.

- b. Boom
 - i. The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
 - ii. All welds shall be crack and corrosion free
 - iii. No member of the boom shall be bent
 - iv. All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes
- c. The sweep area (work area) of the construction machinery shall be always free from obstructions.
- d. The operator cab shall possess good and safe:
 - i. structure, windows and windshield wipers
 - ii. Drivers chair and foot rest
 - iii. Control handles
 - iv. Cab instrumentation
 - v. Telecommunication
 - vi. Cab out fitting
 - vii. Wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

7.5.24 MANDATORY RIGGING REQUIREMENTS

- a. Rigging shall be done under experienced and qualified rigger only.
- b. The primary requirement in rigging shall be to assess the weight of load before attempting any lift.
- c. All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balance vertical loading only.
- d. Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain/wire rope sling, sling hook or other terminal fitting.
- e. Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.
- f. No load shall be slewed over public areas without stopping the pedestrians and road traffic first.
- g. Requirements of outriggers:
 - i. All outriggers shall be fully extended and at all tyres are clear of the ground
 - ii. Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats.

- h. All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.
- i. No close working to any live overhead power line is permitted without the operation of a strict permit to work.
- j. Minimum lighting is to be ensured at all lifting operations.
- k. Failure to do any of the above shall attract penalty from the Employer as per relevant clause

7.5.25 LAUNCHING OPERATION

As launching operation is one of the riskiest job, the contractor shall take utmost precaution at all stages like planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

- i. Necessary working platforms and fall protection anchorage arrangement shall be provided in the launching girder itself.
- ii. Provisions for mounting light fittings shall also be made available in the launching girder.
- iii. The casting yard shall be established ensuring the provision given in batching plant/casting yard clause
- iv. The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- v. Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.
- vi. Trucks with valid registration, licence, safe worthiness certificate, employer's approval certificate, and pollution under check certificate shall only be used for transport of segments
- vii. Drivers engaged for driving these trucks, shall be trained once in 6 months at recognized training Institute on defensive driving.
- viii. Drivers shall also have undergone proper medical examination as per relevant clause mentioned under Medical Facilities.

- ix. The segments shall rigidly secured to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day/night time.
- x. Every launching girder shall have a responsible engineer on duty all the time.
- xi. All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.
- xii. Unloading of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.
- xiii. Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
- xiv. The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
- xv. A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
- xvi. Test certificate for all lifting gears including Macalloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
- xvii. Adequate lighting at all time shall be ensured in the entire area of operation.
- xviii. Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.
- xix. Proper access ladders/stairways shall be maintained for safe ascending/descending of workmen/engineers.

Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

7.5.26 CONSTRUCTION MACHINERY

A large number of men and machinery are deployed by the contractors for construction work, bridge rebuilding etc. It is therefore essential that adequate safety measures are taken for safety of trains as well the workforce. The following measures should invariably adopt:

- i. The contractor shall not start any work without the presence of MRVC supervisor or his representative and contractors' supervisor at site.
- ii. Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose the area where road vehicles and/or machinery are required to ply, shall be demarcated

and acknowledged by the contractor. Special care shall be taken for turning / reversal of vehicles / machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

- iii. The look out and whistle caution orders shall be issued to the trains and speed restriction imposed where considered necessary. Suitable flagmen / detonators shall be provided where necessary for protection of trains.
- iv. The supervisor / workmen should be counselled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by APM which will be valid only for the work which it has been issued.
- v. The unloaded ballast/ rails/ sleepers/ other way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- vi. Supplementary site instructions, wherever considered necessary, shall be issued by the Engineer in Charge of MRVC.

The Engineer in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also be ensured that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted/ followed while executing the work.

There shall be an assurance register kept at each site, which will have to be signed by both i.e. MRVC Supervisor or his representative as well as contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipment, mobile elevation work platforms, cranes, tipper lorries, lorry loaders, skip wagons. 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels, trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and bowsers, trailers, hydraulic and mechanical breakers etc.

Safe worthiness certificate: Every construction equipment shall be in sound mechanical working condition undertaken in the past, any accident to the equipment, visual examination details critical components safety check, devises and its working condition, manufacturer's maintenance checklist, past projects wherein the equipment were used etc as its minimum content.

Reverse Horns: All Vehicles shall be fitted with audible reverse alarms and maintained in good working conditions. Reversing shall be done only when there is adequate rear view visibility or under the directions of a banksman.

General Operating procedures:

- i. Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.
- ii. No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers' recommendations.
- iii. Working on gradients beyond any equipment capability shall not be allowed.
- iv. Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
- v. The manufacturer's recommended bucket size must not be exceeded in excavators.
- vi. If excavators operating on a gradient, which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banksman to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.
- vii. When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.
- viii. When operating the backhoe in poor ground conditions, the stabilizers tend to sink into the surface of the ground, reducing stability. Therefore, frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilize the machine when the backhoe is employed.
- ix. The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform.
- x. If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
- xi. When two or more scrapers are working on the same job, a minimum distance of at least 25m or adequate shall be kept between them.

- xii. In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition.

All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.

Penalty: If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.

7.5.27 MACHINE AND GENERAL AREA GUARDING

The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

7.5.28 MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

The contractor shall ensure at his construction site of construction work that no worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, unless aided by another worker or device.

Person	Maximum weight in Kg.
Adult man	55
Adult woman	30

No worker aided by other worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each worker separately as mentioned in the table above

7.5.29 SITE ELECTRICITY

Competency of Electrical personnel:

The contractor shall employ qualified and competent electrical personnel

Assessment of power:

- i. The contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the contract.

- ii. The contractor shall elaborate as to how the total supply is to be obtained/ generated. The details of the source of electricity, earthing requirement, substation/ panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.
- iii. The main contractor shall take into consideration, the requirements of the sub-contractor electric power supply and arrive at the capacity of main source of power supply from diesel generators.
- iv. As small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.

If any unsafe noise making small capacity diesel generators are found used by sub-contractors/contractor the main contractor shall only be penalized.

Work on site:

The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.

Strength and capability of electrical equipment:

No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.

Adverse or hazardous environments:

Electrical equipment which may reasonably be exposed to-

- i. mechanical damage;
- ii. the effects of the weather, natural hazards, temperature or pressure;
- iii. the effects of wet, dirty, dusty or corrosive conditions; or
- iv. any flammable or explosive substance, including dusts, vapours or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.

Distribution system:

The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances.

- i. Fixed plant - 400V 3 phase

- ii. Movable plant fed via trailing cable over 3.75 kW- 400 3 phase
- iii. Installation in site buildings- 230V single phase
- iv. Fixed flood lighting- 230V single phase
- v. v. Portable and hand tools- 115V single phase
- vi. Site lighting - 115V single phase
- vii. Portable hand lamps - 115V single phase

Electrical protection circuits:

- i. Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.
- ii. If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger
- iii. Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.
- iv. The contractor shall provide sufficient ELCBs (maintain sensitivity 20mA)/RCCBs for all the equipment (including Potable equipment), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.
- v. All protection devices shall be capable of interrupting the circuit without damage to any equipment and circuits in case of any fault may occur.
- vi. Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.
- vii. Protection against lightning shall be ensured to all equipment kept in open at sites.

Cables:

- i. Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3kV shall be in accordance with BS 6346.
- ii. For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007/BS 6500/BS 7375.

- iii. Flexible cords with a conductor cross sectional area smaller than 1.5mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375. Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for underground cables BS 6346 and BS 6708.
- iv. Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.
- v. Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.
- vi. Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provide for convenient means of suspension. Minimum height shall be 6m above ground.
- vii. Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armour or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/ or armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.
- viii. Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame-retardant compound shall be used whenever there is a risk of mechanical damage occurring.

Plugs, socket-outlets and couplers:

The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as splash proof type. The minimum degree of ingress protection should be of IP44 in accordance with BS EN 60529.

Only plugs and fittings of the weatherproof type shall be used and they should be colour coded in accordance with the internationally recognized standards for example as detailed as follows:

- i. 110 volts: Yellow
- ii. 240 volts: Blue
- iii. 415 volts: Red

Connections

- i. Every joint and connection in a connection system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.
- ii. No loose connections or tapped joints shall be allowed anywhere in the
- iii. work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.

Portable and hand-held equipment:

The contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e. two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.

Other equipment:

- i. All equipment shall have the provision for major switch/cut-off switch in the equipment itself.
- ii. All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and Prevent unauthorized access.

Approved perimeter marking shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER-HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.

Work on or near live conductors:

No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless

- i. it is unreasonable in all the circumstances for it to be dead; and
- ii. it is reasonable in all the circumstances for him to be at work on or near it while it is live; and
- iii. suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

Inspection and Maintenance:

- i. All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.
- ii. Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations

25 KV AC 50 Hz single phase Traction:

- a. Induction effect of 25 KV AC 50 Hz single phase Traction
 - i. The attention of all staff is drawn to the fact that under 25 kv ac 50 Hz single phase traction, there is heavy induction on all metallic structures and conductors in the vicinity of the track. The induction is two – fold.
 - Electro- static, which results from the high potential of 25 kv on the OHE system.
 - Electro- magnetic, which is proportional to the currents passing from the sub -station to the OHE to the locomotives /EMUs and back partly through the earth.
 - ii. The voltage induced is quite appreciable on overhead conductors running parallel to the tracks depending on the length of parallelism. This explains why most of the overhead telecommunications lines are replaced by underground cables. Special protective measures are required to reduce the adverse effects of induction.
 - iii. In a railway yard, voltage of the order of 200 volts may be induced on yard lighting mains situated 8 m away from the centre of a double- line track, of it runs parallel to the 25 KV lines for a distance of about 270m; it could be several thousand volts when parallelism is much longer. In such a case, a dangerous voltage due to induction will exist even after power supply to the line has been switched off. No one shall therefore attempt to work on any overhead line running alongside the electrified tracks without taking special precautions of earthing on both sides of the work. Before a section is electrified, the necessary modifications to distribution lines in all stations and yards should be carried out, so as to limit the induced voltage within permissible values, but this by no means limits the need for earthing the lines on both the sides of the working party. Earthing should be done individually by each working party as close to the work spot as possible. The distance between the two earths shall not exceed 1 km.

- iv. such inductive effects occur on large metallic structures such as fencings, structural steelwork of platforms running parallel to the track. They will therefore, have to be earthed suitably to afford safety.
- v. Inductive effects also show themselves on any metallic conductor, such as metallic clothes- lines, power lines and lines belonging to private parties running parallel and close to the electrified tracks. Wide publicity should be given to the effects of induction so that special precautions are taken by the private parties.

b. General Precautions

The precautions laid down below must be followed under all circumstances in sections equipped for 25 kv as single phase, 50 Hz traction.

- i. No work shall be done above or within a distance of 2 m from the live OHE without a "permit-to-work."
- ii. No part of a tree shall be nearer than 4 m from the nearest live conductor. Any tree or branches likely to fall on live conductor should be cut or trimmed periodically to maintain this clearance. Cutting or trimming should be done by the OHE staff themselves or through an agency manage and supervised by them.
- iii. Work for trimming of trees should also be done in the presence of authorized OHE staff or supervisor to maintain the safe clearance of 4mt. Any dispute regarding cutting of trees may be done on contract basis or departmentally of the terms & conditions of concerning deptt.
- iv. No fallen wire or wires shall be touched unless power is switched off and the wire or wires suitably earthed. In case the wires drop at a level crossing, the Gate-keeper shall immediately make arrangements to stop all road traffic and keep the public away.
- v. As far as possible closed wagons shall be used for material trains. In case open or hopper wagons are used, loading and unloading or such wagons in electrified tracks shall be done under the supervision of an Engineering Official not below the rank of a APM who shall personally ensure that no tool or any part of the body of the worker comes within the 'danger zone' i.e., within 2 m of the OHE.
- vi. Permanent Way staff should keep clear of the tracks and avoid contact with the rails either when approaching or reaching the work-spot when an electrically hauled train is within 250m.
- vii. When unloading rails alongside the tracks, it should be ensured that rails do not touch each other to form a continuous metallic mass of length greater than 300m.

- c. Safety precautions on Electrified Sections (Chapter-IV), Electrical Accidents (Chapter-V) Fire Precautions (Chapter-VI) of Indian Railways AC Traction Manual Volume-I, as applicable may be followed.
- d. The Training and Competency Certificates (Chapter XII) of Volume-II, part-I of Indian Railway AC Traction Manual may be followed.
- e. Power Blocks and Permit to Work are required to be taken in case of construction work going on in the vicinity of electrified line as per applicable Para of Chapter -VI of volume-11, part- I of Indian Railway AC Traction Manual.

7.5.30 LIGHTING

- i. The contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g., flood lighting or high-pressure discharge lamps.
- ii. **Selection of Luminaries:**

The contractor shall select the luminaries as per the area requirement indicated below:

Type of Lighting	Area of Requirement	Luminaries
Area Lighting	Workmen and vehicles to move about in safely	i. Shovel type: non-symmetrical ii. Symmetrical or non-symmetrical tungsten halogen
Beam flood lighting	Concentrated light over an area from a relatively great distance.	i. Portable flood light (Conical beam) ii. Wide angle flood (fan shaped beam) iii. Medium or narrow angle flood (Conical beam)
Dispersive lighting	Lighting for indoor	i. Dispersive (Mercury florescent) ii. Cargo cluster iii. Florescent through
Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold	i. Well glass unit

	access routes, etc.	<ul style="list-style-type: none"> ii. Bulkhead unit (tungsten filament) iii. Bulk head unit (florescent)
Local lighting	Lighting on sites and fittings are generally accessible to operatives	<ul style="list-style-type: none"> i. PAR (Parabolic Aluminised Reflector) lamp cluster ii. Festoons (with or without shades) iii. Adjustable florescent work lamp iv. Portable flood lamp (mounted on own cable drum)

- iii. The contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.
- iv. Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.
- v. The correct type of lamp for each luminaries should always be used and when lamps need to be replaced if shall be in accordance with the supply voltage.
- vi. Lamp holders not fitted with a lamp should be capped off.
- vii. The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **MRVC/SHE/GI/10**.

7.5.31 HAND TOOLS AND POWER TOOLS

- i. Use of short/damaged hand tools shall be avoided and the contractor shall ensure all his hand tools used at his work site are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.
- ii. All hand tools and power tools shall be duly inspected before use for safe operation.
- iii. All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometries.

Hand tools:

Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, nail pullers.

The contractor shall ensure that

- i. For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
- ii. Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
- iii. Unless hatchet has a striking face, it shall be used as a hammer.
- iv. Only knives of retractable blades shall be used in the worksite.
- iv. No screwdrivers shall be used for scraping, chiseling or punching holes.
- vi. A pilot hole shall always be driven before driving a screw.
- v. Wherever necessary, usage of proper P P E s shall be used by his employees.

Power tools:

Power tools include drills, planes, routers, saws, jackhammers, rinders, sprayers, chipping hammers, air nozzles and drills.

The contractor shall ensure that

- i. Electric tools are properly grounded or/and double insulated.
- ii. GFCs/RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
- iii. Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
- iv. When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment, which gives out more noise as mentioned in clause 43.0 of this contract document.
- v. Tool is held firmly and the material is properly secured before turning on the tool.
- vi. All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
- vii. When any work/operation need to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
- viii. Size of the drill shall be determined by the maximum opening of the chuck in case of drill bit.
- ix. Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
- x. Stock should be clamped or otherwise secured firmly to prevent it from moving.

- xi. Workers shall never stand on the top of the ladder to drill holes in walls! ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.
- xii. Electric plane shall not be operated with loose clothing or long scarf or open jacket.
- xiii. Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheels and the spindle/wheel specifications shall be checked.
- xiv. All power tools/hand tools shall have guards at their nip points.
- xv. Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid 'kickback'.
- xvi. Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
- xvii. Push sticks shall be provided and properly used to hold the job down on the table while the heels move the stock forward and thus preventing kickbacks.
- xviii. Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- xix. Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- xx. Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapors or gases may be present.
- xxi. Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.
- xxii. Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- xxiii. No worker shall point any power operated/hand tool to any other person especially during loading/unloading.

7.5.32 WELDING, GOUGING AND CUTTING

- i. Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- ii. Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- iii. All gas cylinders shall be fixed with pressure regulator and dial gauges.

- iv. Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- v. Domestic LPG cylinders shall not be used for Gas welding and cutting purpose.
- vi. DCP or CO₂ type fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location, Fire Extinguisher should confirm to latest BIS standard.
- vii. Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g., on the other side of bulkheads).
- viii. Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meter (20 feet) apart or separated by a fire proof, 1.6 meters (5 feet) high partition. Flammable substances shall not be stored within 50 feet of cylinder storage areas.
- ix. Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- x. Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- xi. Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- xii. Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal insert gas (MIG) or tungsten inert gas (TIG) processes.
- xiii. Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- xiv. All electrical installations shall meet the IS: 5571:1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- xv. The current for Electric arc welding shall not exceed 300A on a hand welding operation.

7.5.33 DANGEROUS AND HARMFUL ENVIRONMENT

As per BOCWR,

- i. When internal combustion engines are used into a confined space or excavation or tunnel or any other workplace where either natural or artificial ventilation system is inadequate to keep carbon monoxide below 50ppm, exposure of workers shall be avoided unless suitable measures are taken and provided by the contractor.

- ii. No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes/vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the contractor and certified by the responsible person to be safe.

7.5.34 FIRE PREVENTION, PROTECTION AND FIGHTING SYSTEM

- i. The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.
- ii. Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet BIS Standards.
- iii. All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and firefighting equipment.
- iv. The contractor shall also give consideration to the provision of adequate firefighting arrangements within the underground and tunnelling operations including the provision of Fire Service compatible hose connections and emergency lighting.
- v. As per the BOCWR, all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.
- vi. Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 meters from any construction work or any other combustible materials.
- vii. Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.
- viii. Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills shall be held regularly on monthly basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local Fire station should be prominently displayed near each telephone on site.

7.5.35 CORROSIVE SUBSTANCES

As per BOCWR relevant Rule, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a construction site in a manner that it does not endanger the worker and suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on worker, the contractor shall take immediate remedial measures.

7.5.36 DEMOLITION

The Contractor shall ensure that

- i. All demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
- ii. the concerned department of the Government of local authority be informed and permission obtained wherever required.
- iii. all glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.
- iv. Examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures.
- v. No demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.
- vi. Debris/Bricks and other materials or articles shall be removed by means of
 - a. chutes
 - b. buckets or hoists
 - c. through openings through floors or
 - d. any other safe means
- vii. No person other than workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

7.5.37 EXCAVATION AND TUNNELLING

Excavation:

The contractor shall ensure

- i. where any construction worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.
- ii. Where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.

- iii. excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank.
- iv. metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- v. trench and excavation are protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m

Tunneling:

The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunneling work. The contractor shall appoint a responsible person for safe operation for tunneling work as per relevant Rule of BOCWR.

Warning signs and notices:

The contractor shall ensure that

- i. suitable warning signs or notices, required for the safety of workers carrying out the work of an excavation or tunneling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunneling work.
- ii. such warning signs and notices with regard to compressed air working shall include
 - a. The danger involved in such compressed air work.
 - b. Fire and explosion hazard.
 - c. the emergency procedures for rescue from such danger or hazards.

Work Permit System:

The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide

a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments.

A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

- i. Entry into confined spaces
- ii. Work in close proximity to overhead power lines and telecommunication cables.
- iii. hot work.
- iv. To dig-where underground services may be located.
- v. Work with heavy moving machinery.
- vi. Working on electrical equipment.
- vii. Work with radioactive isotopes.
- viii. Heavy lifting operations and lifting operations closer to live power line.

The permit-to work system should be fully documented, laying down:

- i. How the system works;
- ii. The job it is to be used for;
- iii. The responsibilities and training of those involved; and
- iv. How to check its operation;

A Work Permit authorization form shall be completed with the maximum duration period not exceeding 12 hours.

A copy of each Permit to Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

7.5.38 WORK TO ADJACENT RAILWAYS

Whenever work is to be executed in close proximity to Indian Railway track then following safety measures will be adopted.

- a. Provision of IRPWM related to block protection, safety precaution for Protection of track must be followed.
- b. Works which is executed within 3.5 mtr from centre line of existing Indian Railway track should be executed under block protection and with permit to work from concerned railway
- c. For works to be executed between 3.5 mtr to 6 mtr from centre line of existing Indian Railway track work to be executed after erection of fencing as per approved plan.

- d. For works to be executed beyond 6 mtr from centre line of existing Indian Railway track, it must be ensured that no vehicle I construction equipment infringes demarcation line marked at 3.5 mtr from centre of existing railway track.
- e. All utilities, signaling cables, signaling equipment, pipelines, gate lodges, staff quarters etc., coming in the alignment must be shifted I relocated as per approved plan before undertaking earth-work. Programme
- f. During earth-work if any signaling cable not identified earlier got damaged it should be immediately reported to Railway and immediate action should be taken for repair of the same to avoid interruption to traffic.
- g. Any material unloaded along the track should be kept clear of moving dimensions and stacked at minimum 3.5 mtr from track centre of running track.
- h. Movement of vehicle I working of machineries should not be permitted during night. In case night working is to be adopted proper fencing at mtr from track centre of running track should be erected to ensure that no infringement of moving dimension takes place. Suitable lighting arrangements should also be done.
- i. Working in existing railway station area for modification of existing siding I line must be done after approval of plan and with permit to work from Railway.
- j. Modification to road surface at existing level crossings which may cause interruption to road traffic should be executed as per approved plan with the approval of concerned local authorities.
- k. Launching of girders for construction of ROB I rail flyover I modification to existing ROBs should be done as per approved plan and scheme with permission to work from Railway I road authorities.
- l. For construction of new bridge over canall extension of existing bridge over canal approval of respective authorities should be taken before undertaking work.

Safe working of contractors-A large number of men and machinery are deployed by the contractors for construction work, bridge rebuilding etc. It is therefore essential that adequate safety measures are taken for safety of trains as well the workforce. The following measures should invariably adopt:

- a. The contractor shall not start any work without the presence of MRVC
- b. supervisor or his representative and contractor's supervisor at site.
- c. Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose, the area where road vehicles and/or machinery are required to ply, shall be demarcated

and acknowledged by the contractor. Special care shall be taken for turning I reversal of vehicles I machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

- d. The look out and whistle caution orders shall be issued to the trains and speed restriction imposed where considered necessary. Suitable flagmen I detonators shall be provided where necessary for protection of trains.
- e. The supervisor I workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by APM WHICH WILL BE VALID ONLY FOR THE WORK WHICH IT HAS BEEN ISSUED.
- f. The unloaded ballast/ rails/ sleepers/ other P. way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- g. Supplementary site instructions, wherever considered necessary, shall be issued by the Engineer in Charge of MRVC.
- h. The Engineer in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted, I followed while executing the work.
- i. There shall be an assurance register kept at each site, which will have to be signed by both. i.e. MRVC Supervisor or his representative as well as contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

7.5.39 BATCHING PLANT/CASTING YARD

- i. The batching plan of casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.
- ii. The batching plan of casting yard shall be barricaded and made as a compulsory PPE zone.
- iii. If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barricading.

- iv. Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- v. Drainage shall be effectively provided and waste water shall be disposed after proper treatment.
- vi. Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- vii. Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- viii. The PPEs provided to cement handling workmen shall conform to international standards.
- ix. Access roads and internal circulation roads shall be well laid and maintained properly at all time.
- x. Non-adherence to any of the above provision shall be penalized as per relevant penalty clause.

7.5.40 PERSONAL PROTECTIVE EQUIPMENT (PPES)

The contractor shall provide required PPEs to workmen to protect against safety and/or health hazards, Primarily PPEs are required for the following protection

- i. Head Protection (Safety helmets)
- ii. Foot Protection (Safety footwear, Gumboot, etc.)
- iii. Body protection (High visibility clothing (waistcoat/jacket), Apron, etc.)
- iv. Personal fall protection (Full body harness, Rope-grab fall arrester, etc.)
- v. Eye Protection (Goggles, Welders glasses, etc.)
- vi. Hand Protection (Gloves, Finger coats, etc.)- electrical hand gloves, acid/chemical handling hand gloves
- vii. Respiratory Protection, (Nose mask, SCBAs, etc.)
- viii. Hearing Protection (Ear plugs, Ear muffs, etc.)

The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the contractor as approved by the Employer shall procure PPE and safety appliances meeting international standard.

All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994 as most of viaduct/tunneling and station works are executed either above or under right-of- way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

The contractor shall provide safety helmet, safety shoe and high visibility clothing for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirements.

All employees of the Contractor including workmen	Traffic marshals
<ul style="list-style-type: none"> i. Hard hat with company Logo ii. Safety boots iii. Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994 <ul style="list-style-type: none"> a. Background in fluorescent orange-red in colour b. Two vertical green strips of 5 cm wide on front side, covering the torso at least 500 cm². c. Two diagonal strips of 5 cm wide on back in an 'X'. d. Horizontal strips not less than 5 cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. e. the bottom strip shall be at a distance of 5 cm from the bottom of the vest. f. Strips must be retro reflective and fluorescent. g. Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon. 	<ul style="list-style-type: none"> i. Hard hat with reflective tape ii. Safety boots iii. Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994 <ul style="list-style-type: none"> a. Background in fluorescent orange-red in colour b. Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5 cm from the bottom of the sleeve. c. Two vertical green strips of 5 cm wide on front side covering the torso at least 500 cm². d. Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570 cm². e. Horizontal strips not less than 5 cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f. The bottom strip shall be at a distance of 5 cm from the bottom of the vest. g. Strips must be retro reflective and fluorescent.

Table 7-1 Colour code for helmets

Safety Helmet Colour Code(every helmet should have theLOGO* affixed/printed)	Person to use
White	MRVC Staffs
Grev	All Designers. Architect. Consultants. etc.
Violet	Main Contractors (Engineers/Supervisors)
Blue	All Sub-Contractors (Engineers/Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety professionals (Both Contractor and Sub-contractor)
Orange	Security Guards/Traffic marshals
Yellow	All workmen
White (With "VISITOR" sticker)	Visitors

Note: LOGO*

1. Logo shall have its outer dimension 2"X2" and shall be conspicuous.
2. Logo shall be either painted or affixed.
3. No words shall come either on Top/Bottom of Logo Logo of the corresponding main contracting company for their employees and sub- contracting company for their employees shall only be used.

In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunneling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.

The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.

The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.

It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

7.5.41 VISITORS TO SITE

- i. No visitor is allowed to enter the site without the permission of the Employer. All authorized visitors should report at the site office. Contractor shall provide visitor's helmet (White helmet with visitor sticker) and other PPEs like safety shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- ii. All visitors shall be accompanied at all times by a responsible member of the site personnel.
- iii. The contractor shall be fully responsible for all visitors' safety and health within the site.

7.6 Safety Management Plan

Contractor shall spell out in summary form a Safety Plan complying with his obligation in relation to safety and industrial health,

The "Safety Plan" shall include but not be restricted to:

- i. A list of safety and health hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;
- ii. Details of the safety equipment's which would be provided by the Contractor, including Personal Protective Equipment;
- iii. A statement of the Contractor's procedures for reporting and investigating accidents, dangerous occurrences or occupational illness
- iv. Risk assessment of workplace;
- v. Measures and requirements for safety and health performance of construction works,
- vi. Personal protective equipment,
- vii. Safe work instructions,
- viii. Plans for fire prevention and firefighting,
- ix. Emergency and evacuation plans for workers and occupants of the site,
- x. Assessments and adherence to health and safety and other requirements arising from legislation on labor protection.
- xi. Maintain logbooks, assignments of duties, permits etc
- xii. Electromagnetic safety if applicable
- xiii. Contractor may consider use of the following checklists:

Safety Checklist

Project Title:					
Location / Name of Station:					
Name of Agency:					
Date of Inspection:					
Sr. No.	Items to be Inspected	YES	NO	N/A	Remarks
General					
1	Posters and Safety Signs? If yes, are they legible?				
2	Are safety meetings held periodically? Is a Safety Register maintained?				
3	General neatness of work area maintained?				
4	Are passengers walkways clear?				
5	Is adequate lighting present?				
6	Are sanitary facilities adequate and clean?				
7	Is adequate potable water supply available?				
8	Are open ditches protected?				
9	Are equipments protected and well maintained?				
10	Is contractor's Supervisor present at site?				
11	Are lookout men/ safeguards for work near to the tracks available?				
12	Is worksite being used as shortcut to the station etc.?				
13	Is any machine left unattended/unsecured?				
14	Is the the vicinity of tracks safely barricaded all over the site?				
Personal Protection					
1	Are safety glasses/goggles available + being used?				
2	Are face shield available for bulk liquid tasks? (e.g. welding)				
3	Are hand protection used/worn as and when required?				
4	Are foot protection used / worn as and when				

	required?				
5	Are hearing protection used/worn as and when required?				
6	Are helmets worn when falling object hazard is present?				
7	Are safety jackets worn when required?				
Emergency Units					
1	Are emergency phone numbers posted and known to all?				
2	Is first aid kit available at work site?				
3	Is there a first aid trained competent person available?				
4	Are fire extinguishers readily available? If yes, are they inspected regularly?				
5	Are traffic routes identified?				
6	Is a resuscitation chart available?				
Certificates & Documents					
i.	Competency Certificate of contractor's supervisor and artisans/machine operators issued by AEN?				
ii.	Is a list of Do's and Don'ts for various types of jobs posted in local language?				
	If yes, is endorsement by each worker taken of having understood the same?				
iii.	Is fitness certificate of various machines for its rated capacity available?				
iv.	Do the machine operators have a valid certificate?				
v.	Are the following documents/items available for various vehicles:				
	License				
	Insurance				
	PUC				
	Seatbelt				
Construction					
1	Excavation				
	i. Excavation is barricaded or shored?				
	ii. a. Are ladders being used or slope given for > 4 feet excavations?				
	b. Type of ladder(Metal/Wooden/Fibre)				

	iii.	Have underground utility installations been Identified by manual digging of trial pit?				
	iv.	Are gas lines and power cables protected?				
	v.	Is standing water removed before work starts or regularly as it accumulates?				
2	Storage					
	i.	Are all construction materials properly stored /stacked/cribbed?				
	ii.	Are materials being transferred over the tracks?				
	iii.	Are flammable liquids placed in safety cans ?				
	iv.	Are all structural members free from defects and meet safety factors?				
3	Blasting/Cutting/Welding					
	i.	Are work permits obtained for Cutting/Welding/Blasting?				
	ii.	Are explosives stored properly?				
	iii.	Is sufficient employees present at the site for the required job?				
	iv.	Are experienced and trained personnel handling the explosives?				
	v.	Are all hazardous containers labeled properly?				
	vi.	Are gas cylinders stored upright?				
4	Concreting					
	i.	Are forms properly installed and braced for concrete construction?				
	ii.	Are forms at safe distance from the overhead wires?				
	iii.	Is 100% fall protection in place above 6 feet height?				
5	Embankment					
	i.	Is the embankment properly protected for the works adjacent to the existing embankment?				
	ii.	Is there any dust pollution due to plying of vehicles on embankment etc. which can impair the visibility for trains and workers near track?				
	iii.	Is any water seepage and mitigation from the banks of excavation observed?				
		If yes, has running water been diverted from banks of excavation to prevent erosion?				
6	Electrical					

	i.	Is power block taken by competent authority before starting the work?				
	ii.	Before starting the work, is proper earthing done on both sides of the working area in proximity of the OHE?				
	iii.	Is earthing of equipments proper?				
	iv.	Is earthing removed on completion of the work?				
	v.	Are wires for welding machine, wires for lighting or any other work kept loose, unsecured or in hanging position and likely to fall on OHE?				
	vi.	Are any unwanted metal pieces kept in the vicinity of the worksite and likely to fall on OHE?				
7		Signal & Telecommunication				
	i.	Is there any exposed working cable on an excavation site?				
		If yes, are the exposed cables protected?				
	ii.	Is there any infringement to working gears?				
	iii.	Are excavated earth/materials stacked away from track/location box etc.?				
	iv.	Is there any hazard of cable drums/other materials rolling onto a running line?				

7.6.1 CONSTRUCTION PHASE

The safety aspects like (i) safety of construction workers, (ii) safety of trespassers, (iii) safety of local community (iv) unsafe/ hazardous traffic conditions due to construction vehicle movement need to be considered during the construction stage. The following measures should be adopted to minimize impact on Safety, Health and Environment.

1. All electrical equipment's installed shall have shock preventive mechanisms like automatic shutdown.
2. Workers should be provided with adequate personal protective equipment's such like hand gloves, safety shoes, safety goggles, hard safety helmets. Ear plugs or ear muffs shall be given to person involved with heavy noise generating machinery.
3. Training should be provided to workers about hazards related to the job, usage of tool box, health and safety.
4. The building and other construction workers' (regulation of employment and conditions of service) act, 1996 requires that
 - No child labor should be involved in any of the activities
 - Only competent person should allow on heavy work.

- All equipment's and machinery shall be inspected before starting the work and all are certified by the competent person.
 - Every worker should be provided training related to job safety and other hazards related to job.
 - Periodical medical checkups shall be organized for workers.
 - Each worker shall be given personal protective equipment (PPE) which is mandatory to use while working.
 - Each incident should be reported so that preventive measure can be taken to avoid reoccurrence of such incident.
 - All hazardous chemicals and materials shall be stored in dedicated area and covered. Signboard and labelling should be done. Also, every chemical shall have material safety data sheet (MSDS).
5. Contractors should provide drinking water, facilities as adequate number of urinals and latrines for work area, sheds in summer and rainy season to rest or lunch.
 6. Use of prohibited and restricted materials at site shall be avoided.
 7. Training shall be provided to workers, especially machinery operators, on safety procedures and precautions. Helmet will be required at all construction sites.
 8. The contractor will be required to appoint a safety officer who will conduct regular safety inspections at construction sites.
 9. At every workplace, the Implementing Agency/Contactor in collaboration with local health authorities will ensure that a readily available first-aid unit including an adequate supply of sterilized dressing materials and appliances is made available. Access to the ambulatory services should be provided to approach the nearest hospital in case of an emergency. The Implementing Agency/Contractor will ensure good health and hygiene of all workers to prevent sickness and epidemics.
 10. Efforts shall be made to avoid the storage of hazardous chemicals near any residential area. Hazardous chemicals shall be labelled and stored in locked facility under authorized person.
 11. Contractors shall be required to adopt and maintain safe working practices. Usage of appropriate signage in local language at the construction sites should be displayed generously and visibly to make the travelers aware of the ongoing work.
 12. Adequate barricading, lighting and fluorescent signage shall be provided at the construction sites.
 13. The Contractor will be required to appoint an Accident Prevention Officer (APO) who will conduct regular safety inspections at construction sites. The APO will have the authority to issue instructions and take protective measures to prevent accidents.
 14. All equipment and machineries to be used shall comply with the design safety.
 15. All equipment and machineries shall be inspected and certified by competent person.

16. All equipment and machineries shall comply with industrial standards.
17. Preventive maintenance and servicing of equipment and machineries should be done to avoid any incident and breakdown.
18. Each and every machine and tools should be inspected by the operator and supervisor before start of work.
19. Implementation of an overall safety management program equivalent to internationally recognized railway safety programs is prescribed.
20. Contractors should display appropriate signage in local language at the construction sites to make the people aware of the on-going work

Safety of passengers, staff and general public is paramount for all activities of Railways, Most of the works are to be done in the Passenger traffic area. The works across the track will be taken up during night blocks and mega blocks as permitted by Railways. At no point during the work, any inconvenience should be caused to the normal movement of the passengers, proper barricading, provision of adequately visible signage, illumination, and devices, as approved by Engineer and deployment of safety personnel shall be done all site for passenger movement for the duration of each activity.

Prime consideration shall be given to all the issues that can have an effect on safety. The Contractor shall evolve & implement the Safety Management Requirements, in consultation and agreement with the Engineer in advance of commencement of each activity. In case of any disagreement, the same will be brought immediately to the attention of the Employer. The view of the Employer shall be treated as final implemented as soon as possible.

CHAPTER 8. ANALYSIS OF ALTERNATIVES

The chapter details the analysis of alternative stations selected for the proposed Improvement plan by MRVC. The principal objectives considered for selecting the stations for the proposed station improvement plan include:

- Minimisation of Impacts on Environmental and Social features
- Minimisation of Construction time
- Maximisation of benefits to the economic investment

For the proposed station improvement project at 17 stations, a preliminary environmental analysis of the project has been done. This is to identify environmentally and social sensitive areas early on, so that these areas can be avoided if possible, during design stage have been given due importance while identifying the other parameters.

As the proposed works are related to improvements of the existing 17 stations, hence Alternative Analysis study is not anticipated. However, during the DPR preparation the station improvement elements were finalized based on various design considerations to reduce the impact on environmental and social aspects. Based on above consideration, concept plan has been prepared by DPR consultant and approved by MRVC. As per the approved concept plan, GAD is finalised & in approval stage & alternatives are freeze.

CHAPTER 9. PUBLIC CONSULTATIONS AND INFORMATION DISCLOSURE

9.1 Background

Stakeholder consultation is a continuous process throughout the project period, right from project preparation, implementation, monitoring and evaluation stages. The sustainability of any infrastructure development project depends on the participatory planning, in which stakeholder consultation plays a major role. Aiming at the promotion of public understanding, various stakeholders i.e., displaced persons, various department government officials, local community members, and local people, are consulted through community meetings, focus group discussions, individual interviews and formal consultations. To ensure that the affected population and other stakeholders are informed, consulted, and allowed to participate actively in the development process. This will be done throughout the project, both during preparation, implementation, and monitoring and evaluation of project results and impacts.

Consultation and stakeholder engagement is a two-way process, that make people aware of the up-coming sub-project under MUTP-III A. i.e., the improvement of 17 identified stations, and at the same time enable them to express their views and suggestions in order to make it more meaningful and beneficial to all. The objective of the consultation and participation mechanism is to minimize negative impact of the project and make people aware of it. Stakeholders identified in the project, public consultation and methods of consultation, a summary of consultation plan for further consultations and information disclosure are discussed in this chapter.

9.2 Project Stakeholders

Stakeholders can be classified as primary and secondary stakeholders. Primary stakeholders are stakeholders who are likely to be benefitted, affected, or influenced directly due to the proposed project, whereas secondary stakeholders are stakeholders who are likely to be influenced, benefitted, or affected indirectly due to the proposed improvement of 17 identified stations in the Mumbai Suburban Railway. RITES, in consultation with MRVC, identified Primary and Secondary stakeholders for the proposed development. The consultations were conducted with project affected families (PAFs), passengers, shopkeepers, and local community members as primary stakeholder. Station masters, various government departments, CBOs (Community Based Organizations), auto and taxi drivers have been identified as secondary stakeholders.

9.3 Consultations in the Project

Keeping in mind the significance of consultation and the participation of the people who are likely to be affected due to the proposed project, public consultation has been taken up as an integral part of the social and environmental assessment process. Consultation was used as a tool to inform and educate stakeholders about the proposed action both before and after the development decisions were made. It assisted in the identification of the problems associated with the project as well as the needs of the population who are likely to be affected. This participatory process helped in reducing the public resistance to change and enabled the participation of the local people in the decision-making process. Initial public consultation has been carried out through community meetings, focus group discussions and individual interviews in the project areas with the objectives of minimizing probable adverse impacts of the project and to achieve speedy implementation of the project through generating awareness among the community about the benefits of the project. Consultations will also be carried out during the implementation, monitoring and evaluation stage. Concerns, views and suggestions expressed by the participants during these consultations have been presented in minutes of consultations in **Annexure 9.1 & 9.2**.

9.4 Methods of Consultation

Preliminary public consultations and discussions were facilitated by the RITES study team through community meetings with Project Affected Persons (PAPs) as well as public and group discussions at identified stations in Mumbai Suburban Railway network. The consultations were carried out by RITES team with the support of local investigators. The local investigators were provided training to carry out the consultations while ensuring people's participations and focusing on the major issues with various kinds of stakeholders.

The consultation process involved various sections of affected persons, such as traders, shop owners, residents, squatters, kiosks, daily passengers, student and working groups. The station masters, various government departments, CBOs (Community Based Organizations), auto and taxi drivers were consulted at 12 station locations across the Central, Western and Harbour lines of Mumbai Suburban Railway. Focused Group Discussion were conducted with passengers, auto and taxi drivers etc.

The following methods were adopted for conducting public consultation:

- Public meetings/consultations
- Focus Group Discussions (FGD) with different groups of affected people including residential groups, traders, slum dwellers (squatters), daily passengers, auto and taxi drivers etc.
- Discussions and interviews with key informants

Before the commencement of the consultations, the participants were informed in detail about the proposed station development project. During public consultations, issues like

tree cutting, tree transplantation, traffic and pollution during construction, relocation of PAFs, livelihood compensation allowances, decision making, access to basic facilities, safety during travel, employment generation, special facilities for women in trains, awareness about project, women's safety, health and education facilities for children were discussed during consultation across all the station locations. It is to be noted that the participants across all the project locations expressed similar opinion or suggestion in response to the issues discussed during consultations. The Environment and Social Impact Assessment (ESIA) Report and Resettlement Plan (RP) address all issues raised during public consultation and recommend institutional strengthening measures as well. A walk-through informal group consultation at station locations and other nearby locations was conducted, involving different people including residents, traders, shop keepers and slum dwellers who are likely to be affected as well as non-affected people.

The stakeholder consultations were conducted by following the precautionary measures and guidelines issued by Government of Maharashtra during the COVID-19 pandemic situation.. The social distancing measures have been taken care of through the consultations. It is important to be mentioned that due to the current pandemic situation, it was difficult to gather respondents or participants for the consultation process.

9.5 Scope of Consultation and Issues

All the survey and consultation meetings were organized with free and prior information to the affected persons and participants. Women members of the survey team assisted women to present their views on their concerns. During the consultation process efforts were made by the survey teams to:

- Ascertain the views of the affected persons, with reference to improvement of 17 sub urban railway stations in Mumbai and minimization of impacts;
- Understand views of the people and community on land acquisition, resettlement issues and rehabilitation options;
- Identify and assess the major socio-economic characteristics of the people to enable effective planning and implementation;
- Obtain opinion of the community on issues related to the impacts on community property and relocation of the same;
- Examine affected persons' opinion on problems and prospects of transport related issues;
- Identify people's expectations from project and their absorbing capacity;
- Finally, to establish an understanding for identification of overall developmental goals and benefits of the project.

9.6 Major Findings of the Consultation

- The stakeholder consultation was conducted with both types of respondents either directly/indirectly affected by or influenced by the proposed 17 identified station development project in Mumbai. The consultations were conducted at 12 stations across Central, Western and Harbour lines of the Mumbai Suburban Railway Network. A total of 312 persons participated in the consultations. The major findings of the consultation are: The daily passengers will get maximum benefit from the proposed project. The existing station platforms would be more useful and would facilitate the movement of passengers.
- The journey time of the passengers will be saved, and they will experience safe travel due to the development of proposed project.
- Most of the respondents were aware of the proposed project, and they shared a positive response towards station development project.
- The respondent wanted that the resettlement sites should be located within 1 km from the current location of PAFs. So that it is convenient for them to reach to their job locations.
- The resettlement sites should be well equipped with all basic facilities such as drinking water, sanitation, a local market, a school, a college, a hospital, a children's park, religious institutions, a community hall etc.
- Loss of livelihood is a major concern for commercial PAFs due to the development of the proposed project. On the other hand, the proposed project is expected to enhance the livelihood opportunity for shopkeepers, businessmen and the local community.
- The female respondents demanded one additional coach reserved for women on the local train. To ensure women's safety, all local stations should have a female security guard on duty 24x7.
- The PAFs opted house for house and shop for shop under rehabilitation and resettlement option but few respondents opted cash for structure loss. The compensation amount should be paid as per the market rate.
- The government should utilize the existing government land available near the stations in order to avoid private land acquisition.
- Trees should be saved or transplanted instead of being cut down.
- They are habitual to noise and vibration due to running trains.
- Very little pollution is anticipated due to proposed development activity because heavy machinery is not expected to be used during the construction.
- Trespassing is the major problem at the station premises, and they suggested fencing should be done throughout the station.
- 4-wheeler parking should also be part of this proposed development activity at Neral Station.

9.7 Disclosure

In order to make the ESIA & RP preparation and implementation process transparent, a series of public consultation meetings with all stakeholders were carried out in the field for the dissemination of information regarding the rehabilitation process and entitlement framework. The ESIA Report RP and the R&R Policy will be disclosed to the stakeholders. The documents available in public domain will include an executive summary, ESIA Report, RP and R&R Policy. All documents will be kept in the offices of MRVC. As per the PPM Policy of the AIIB, all safeguard documents will also be available at the AIIB Portal. The MRVC will assist in community level disclosure and information dissemination work, which shall include community display, meetings and consultations. Further, consultations will be held among all stakeholders. The executive summary of the ESIA and RP shall be translated in Marathi and disclosed to the stakeholders, and their views and suggestions will be considered depending on their applicability.

CHAPTER 10. GRIEVANCE REDRESSAL MECHANISM

10.1 Introduction

The existing Grievance Redressal Mechanism (GRM) of MRVC for the MUTP 3 Project will be used to receive, evaluate, and facilitate the resolution of affected persons and other stakeholder's concerns, complaints, and grievances about the environmental and social performance at project level. The GRM is intended to provide a trusted way to voice and resolve concerns linked to the project and to be an effective way to address affected persons' concerns without allowing it to escalate resulting in delays in project implementation.

Grievance Redressal Mechanism

The aim of putting this mechanism in place is to receive, evaluate and facilitate the resolution of Project Affected People's (PAPs) concerns, complaints, and any other grievances about the project implementation process, including Environmental and Social (ES) performance³.

The existing Grievances Redressal Cell process of MUTP 3 Project will be followed to receive and respond to the concerns, complaints, and grievances received from the stakeholders. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, in a language they understand, without any retribution, and shall operate in an independent and objective manner.

The Grievances which can be addressed shall include but not limited to:

- Issues related to land acquisition, compensation and resettlement, computation of compensation, land measurement, eligibility for compensation, non-inclusion in the list of PAPs, valuation of structures, trees etc., existing in the acquired land.
- Accidental death or injuries of a community member due to the Project⁴.
- Construction related impacts, including but not limited to,
 - Noise pollution due to vehicular traffic, machinery etc.
 - Air pollution due to construction activities
 - Construction related traffic activities including blocked traffic, speeding, noise, dust and safety impacts on vulnerable receptors Contamination of water bodies due to disposal of any type of waste such as solid waste from labour camps, construction and demolition waste, oil spills etc.
 - Use of productive land for material transportation or storage or labour camps without necessary permissions from concerned authority

³A separate GRM will be established for the workers to address workplace concerns, working conditions, occupational health and safety, code of conduct for workers (Gender-Based Violence in the workplace).

⁴AiIB should be informed about such incidents within 48 hours.

- Damage to any cultural or physical resources outside the project area
- Improper construction site management, improper storage or disposal of waste / debris material, inadequate safety practices, damage to cultural or public properties and issues between the labour force and the local community.
- Impacts on community health, safety and security as a result of construction works, storage of equipment on site

The GRMs shall not impede access to the country's judicial or administrative remedies that might be available. The complainants can approach the court of law at any time, independent of the Project's grievance redress process. If a complaint is not resolved successfully by the Project's GRM, the complainant can raise the issue with AIIB's independent accountability mechanism⁵.

A Communication Strategy will be implemented to orient the community on the functions of the GRM and provide pragmatic solutions to stakeholder engagement, information disclosure and the management of grievances. The Communication Strategy will be published on MRVC's website and put in place immediately after adoption. The Strategy will be implemented in a way that follows national Covid-19 response including social distancing to ensure that communities are not at risk.

10.2 Institutional Arrangement of the GRM

The GRM included two-tier of Grievance Redress Committees (GRCs) one at headquarter level and one at field level on each line i.e Central, Harbour & Western Line for redressing ES matters. It is as per the structure presented in the Environmental Assessment (EA) and Social Impact Assessment (SIA) approved by MRVC, in discussion with AIIB.

10.2.1 WORKING MECHANISM OF THE TWO-TIER GRCS.

Tier 1: Field level GRC (FL-GRC): This will be the first level of grievance redress at field level and will consist of the PAPs representatives, AM/AEN/Exec. Eng MRVC, Sr. Project Engineer/Project Engineer and Contactors. For Land acquisition related queries, the Tier 1 shall consist of Representative of MRVC, Govt. Officer from Collector/SDO for the project.

FL-GRC to the extent possible will address the problem and try and resolve the complaint. The time taken at the field level to address grievances will be a maximum of 14 days. A confirmation of receipt of the grievance should be issued to the aggrieved party within 5

⁵The Project-affected People's Mechanism (PPM) has been established by the AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through Project-level GRM or AIIB's Management. Information on the PPM is available at: <https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html>

working days. This confirmation can be a verbal confirmation if over the phone or in person, a letter if the complaint is received via mail or an email if the complaint is received via email. This confirmation of receipt will be followed up or combined with a statement whether the complaint is eligible for consideration by the FL-GRC. Some complaints might be ineligible if they fall outside of the project scope, area of influence or is not related to project activities.

The FL-GRC will consider any grievance of PAPs, give its decision in writing within a stipulated time preferable within 2 weeks, and keep record of such decisions. If the aggrieved party is not satisfied with the decision, appeal could be made to GRC at Headquarter level. The FL-GRC shall maintain a grievance log where the grievances, contact details of the aggrieved party (if not anonymous complaint), details of the complaint, methods and timeframes for resolution are recorded. This will be submitted to the Headquarter level GRC every month from each FL-GRC, so they can have an overview on the complaints received by all FL-GRCs.

Tier 2: Headquarter level GRC (HQ-GRC) shall be chaired by the respective ED Civil and FA&CAO / ED-Finance MRVC and a nominated officer from MMRDA. The time taken to redress grievances will be 1 month at this level. The HQ-GRC will also issue confirmation of receipt of the complaint within 5 working days. If the complaint requires more time to be resolved, weekly or bi-weekly updates might be provided to the aggrieved party.

The HQ-GRC will consider any grievance of PAPs, give its decision whether the grievance is determined to be eligible for resolution in writing within a stipulated time preferable within 2 weeks, and keep record of such decisions.

The flowchart of the GRM arrangement is given in **Table 10-1**.

Table 10-1 GRM Institutional Arrangement

Tier I FL GRC	<p style="text-align: center;">A. For Grievance relating to land Acquisition</p> <p style="text-align: center;">Complaint</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">PRO-Public Relation Officer</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">Dy. CPM-Civil / Executive Engineer (General Consultant will assist MRVC Official)</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">State Govt Officer from Collector /SDO office For LA grievances</p>	<p style="text-align: center;">B. For Grievance relating to R&R</p> <p style="text-align: center;">Complaint</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">PRO-Public Relation Officer</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">Dy. CPM-Civil / Executive Engineer (General Consultant will assist MRVC Official)</p> <p style="text-align: center;">↓ ↑</p> <p style="text-align: center;">MMRDA Official</p>
Tier II HQ,	<p style="text-align: center;">For Land Acquisition</p> <p style="text-align: center;">Deputy CPM/XEN</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">ED- CIVIL</p>	<p style="text-align: center;">For R&R, Committee of nominated officials will redress the Grievance</p> <p>i) ED-Civil, MRVC - Chairman</p> <p>ii) FA & CAO/ED-Finance, MRVC - Member</p> <p>iii) Deputy CPM/XEN, MRVC-Member</p> <p>iv) Nominated Officer from MMRDA for R&R- Member</p> <p>v) Environmental Expert (1) - Member</p> <p>vi) Social Expert (1) - Member</p>

10.3 Current Status

This FL-GRC is functioning for locations of Mid-Section Trespass component, where construction has commenced, as shown below. The committee consists of a team of representative of Contractor, AM/AEN, Sr. Project Engineer/Project Engineer MRVC. Their names and contact info are displayed at site on a board of information with provision of a complaint box.

Till now no major grievances were received in written. The grievances received orally from local nearby inhabitants (if any), have been resolved effectively by the FL-GRC. Methods of Registering Complaints.

Complainants can register their complaints/ grievances through the following modes –

- Complainant may place his complaint in written by submitting letter personally at office
- Register online through the dedicated link available online on the website of MRVC
- Complainant may use the publicized phone numbers of the FL-GRC or HQ-GRC and log complaints via the phone.

The complaints received in both modes shall be maintained in log register with details of name & contact detail of complainant, date of complaint, grievance, and decision/solution on complaint and date of closure of complaint. The log shall be maintained and available for audits & due diligence later.

At the field level, the complainant can register his/her complaint at field office by giving in writing and submitting a copy of letter to AM/AEN/Exec. Engineer, MRVC available at site. The team at field level shall maintain the log of same in prescribed format as mentioned above.

Report on progress of Grievance Redress shall be documented on a Quarterly basis by COM, MRVC. The document should include the list of new grievances received in the reporting period and number of unresolved past grievances in a format agreed with AIIB.



10.4 Public Communication Plan

AIB's Policy on Public Information applies to the project. In order to widely disseminate the information about various sub-projects of MUTP III A and seek feedback, a Communication Strategy has been proposed:

- a) The detailed information about MUTP IIIA are given to the commuters/general public which include different components of the project, its cost, benefits, time schedule etc.
- b) Advertisements will be given in newspapers for the information of the public.
- c) Representatives of the press are being taken to the relevant sites and are given all the necessary information. Their reports, news, features, articles also help in public communication.
- d) Details of the project are displayed in MRVC's website.
- e) COM/CPRO is responsible for making arrangements for public communication.
- f) Public Relation Officer (PRO) will be a nodal person who will transmit the letter/telephonic grievances register to the respective departments e.g. Social, Environment, Civil, Mechanical, Electrical etc. within MRVC. Based on the response received from the technical team, PRO will respond back to the respective stakeholders via letter/email/telephonic communication regarding the complaints. PRO will also pass on the response of concerns, complaints, and grievances to the contactor and PMC for implementation of the actions suggested by MRVC on the grievances. The PRO shall disseminate the roles and responsibilities of its members and encourage the public to approach it in case they have any concern related to project implementation. The complainant may take recourse to the Court of law, if dissatisfied with the verdict of the GR

10.5 Institutional Framework to Address Gender-Based Violence at Workplace

Definition of Gender-based violence:

According to UNHCR, Gender-based violence refers to harmful acts directed at an individual based on their gender. It is rooted in gender inequality, the abuse of power and harmful norms. Gender-based violence (GBV) is a serious violation of human rights and a life-threatening health and protection issue. It is estimated that one in three women will experience sexual or physical violence in their lifetime. During displacement and times of crisis, the threat of GBV significantly increases for women and girls.

Gender-based violence can include sexual, physical, mental and economic harm inflicted in public or in private. It also includes threats of violence, coercion and manipulation.

Grievance Redressal Mechanism – Gender-Based Violence at workplace

Grievance Redressal Mechanism (GRM) is an arrangement for receiving, evaluating, and facilitating the resolution of the complainant and other stakeholders. The Grievance Redress Committees (GRCs) will have representatives from the organizational level.

This committee will be functional for any type of gender-based violence at workplace. MRVC will develop a Grievance Redress Committee to receive and respond to the complaints related to gender-based violence. The committee members, phone numbers, email address for grievances will be displayed on the office display board.

Grievance Redress Committees– Gender-based violence at workplace

There will be a grievance redress committee to hear and address the grievance related to gender-based violence at workplace. The GRC will be functional as per the constitution of internal committee under Sexual Harassment of Women at workplace (Prevention, Prohibition and Redressal) Act, 2013.

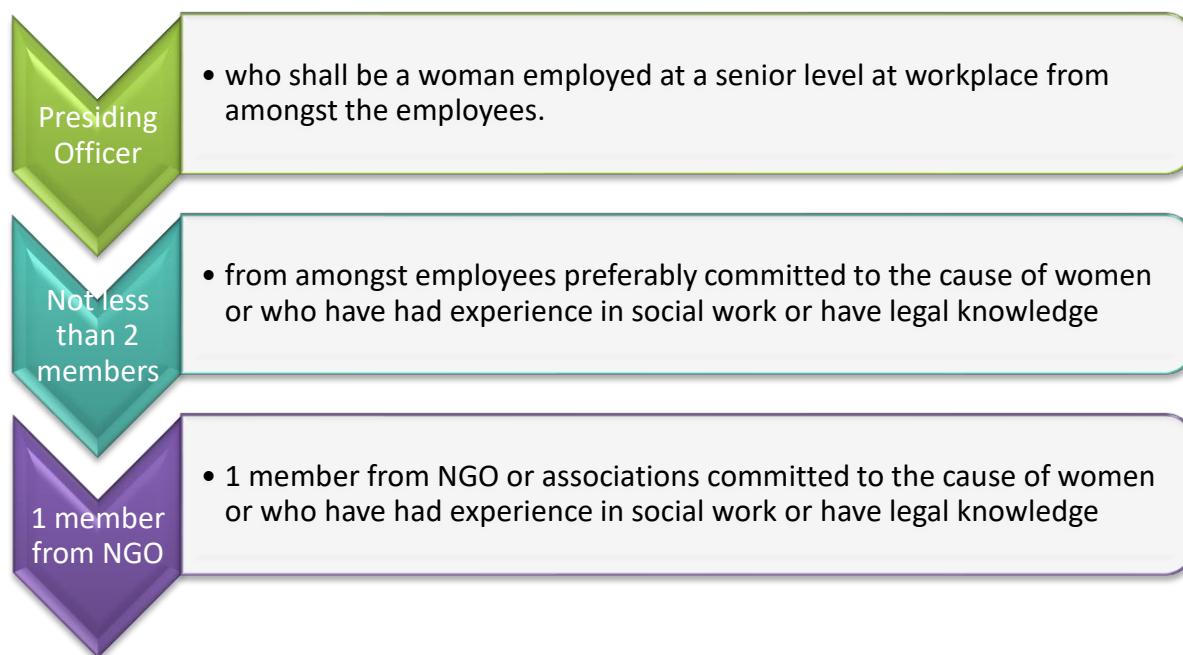
As per the Gazette notification issued on 23rd April 2013 it is mandatory to constitute Internal Complaints Committee under “Sexual Harassment of Women at workplace (Prevention, Prohibition and Redressal) Act, 2013. Railway Board vide RBE No. 15/2015 dated 05.03.2015 had also circulated the guidelines based on the said Gazette notification. Now, Secretary, Ministry of Women and Child Development vide D.O letter dated 22-05-2019 also reiterated to ensure constitution of the internal committee as per the SH Act,2013.

This **Internal Complaints Committee** was formed and notified vide OM dated **28-05-2018**, to address the internal complaints related to gender-based violence at workplace. This committee comprises as following members as under:

Table 10-2: Internal Complaints Committee

Sr. No	Name & Designation	Constitution of the Committee
1.	Chief Engineer	Chairman
2.	Company Secretary	Member

As per Sexual Harassment Act, the Internal Committee shall consist of the following members to be nominated by the employer viz.-



It was observed the Sexual Harassment committee should consist of one member from amongst NGO. In the view, it was proposed to reconstitute the Internal Committee as under:

Table 10-3: Internal Committee as per SH Act, 2013

Sr. No	Name & Designation	Constitution of the Committee
1.	Chief Engineer	Presiding Officer
2.	Company Secretary	Member
3	Member nominated from NGO	Member from NGO

CHAPTER 11. CONCLUSION AND RECOMMENDATIONS

11.1 Introduction

This environmental and social impact assessment has been conducted to evaluate the impacts associated with the improvement of 17 identified railway stations of Mumbai Suburban Railway System. The impact assessment has been conducted in compliance with relevant national legislative requirements and AIIB's Environmental and Social Framework.

11.2 Conclusion

The Project is an improvement of 17 identified railway stations of Mumbai Suburban Railway Network. The Project key components such as FOB, Deck, Entry/Exit, Platform Improvement, Escalators/Lifts and Passengers amenities etc. are likely to have environmental impacts on baseline parameters, such as on land use, ambient air quality and noise quality, especially during the construction phase.

The station improvement project will involve acquisition of total 15.85 ha land. Out of the total land requirement, majority of land (98.99%) belongs to railway authority whereas 1.01% is other government department land. No private land will be acquired. Efforts were made by the MRVC to utilize existing railway land to avoid private land acquisition for the proposed development. Total nine structures are likely to be affected which include four residential and five commercial structures. All nine structures are illegal and developed on government land. Total 18 PAPs are likely to be affected from this proposed development.

The Environmental and Social Management Plan (ESMP) describes mitigation measures for impacts specific to Project activities and also discuss implementation mechanism. Project specific management plans have also been provided for Project activities. The implementation of ESMP will help in complying national/state regulatory requirements. The estimated cost of Management Plan and Monitoring Plan is given in **Table 11-1**.

Table 11-1: The Cost of Management Plan and Monitoring Plan

Sr No	Item	Quantity	Total Cost (Rs)
1.	Management Plan		
i.	Plantation including 5 years maintenance	459	37,44,522
ii.	Transplantation plantation including 3 years maintenance	101	16,99,022
Sub Total			54,43,544 (Rs. 5.44 million)
2.	Monitoring Plan		

Sr No	Item	Quantity	Total Cost (Rs)
i.	Air Quality Monitoring	17 Samples X 12 times in a year X 3 Years	39,78,000
II.	Noise Quality Monitoring	17 Samples X 12 times in a year X 3 Years	9,18,000
III.	Soil Quality Monitoring	17 Samples X 4 times in a year X 3 Years	13,26,000
IV.	Water Quality Monitoring	17 Samples X 4 times in a year X 3 Years	17,34,000
Sub Total			79,56,000 (Rs. 7.95 million)
3.	Rehabilitation and Resettlement Budget excluding estimated cost of direct purchase of land		17,441,380 (Rs. 17.44 million)
Grand Total (1 + 2 + 3)			30840926 (Rs. 30.84 Million)

11.3 Recommendations

The incorporation of environmental and social management plans will have positive impact in enhancing the environmental sustainability of the project. Thus it can be concluded that the project is environmentally & socially sustainable and substantially increase station's quality of service, in terms of comfort, facilities and pedestrian mobility.

A project specific Grievance Redress Mechanism (GRM) and institutional arrangement has been prepared for implementation of project. The MRVC will provide compensation to the PAFs as per entitlement matrix proposed in RP report.

Mumbai Railway Vikas Corporation (MRVC) will be the Implementing Agency, responsible for execution of the Project. MRVC will be supported in implementation activities by Mumbai Metropolitan Regional Development Authority (MMRDA).

An Environmental and Social Management Plan (ESMP) has been developed which shall be followed by the contractor before the commencement of construction work and MRVC will be responsible for implementation of the project whereas MMRDA will be responsible for supervision of resettlement activities.

Annexure 2.1: DRINKING WATER QUALITY STANDARDS (IS 10500:2012)

S. No.	Characteristic	Requirement (Acceptable Limit)	Permissible limit in the absence of alternate source	Remarks
Essential Characteristics				
1	Colour, Hazen units, Max	5	15	Extended to 15 only, if toxic substances are not suspected in absence of alternate source
2	Odour	Agreeable	Agreeable	a) Test cold and when heated b) Test at several dilutions
3	pH Value	6.5 to 8.5	No relaxation	-
4	Taste	Agreeable	Agreeable	Test to be conducted only after safety has been established
5	Turbidity NTU, max	1	5	-
6	Total dissolved solids, mg/l, Max	500	2000	-
7	Aluminium (as Al), mg/l Max	0.03	0.2	-
8	Ammonia (as total ammonia-N), mg/l Max	0.5	No relaxation	-
9	Anionic detergents (as MBAS), mg/l, Max	0.2	1.0	-
10	Barium (as Ba), mg/l, max	0.7	No relaxation	-
11	Boron (as B), mg/l Max	0.5	1.0	-
12	Calcium (as Ca) mg/l, Max	75	200	-
13	Chloramines (as Cl ₂), mg/l, Max	4.0	No relaxation	-

S. No.	Characteristic	Requirement (Acceptable Limit)	Permissible limit in the absence of alternate source	Remarks
14	Chloride (as Cl) mg/l, Max	250	1000	-
15	Copper (as Cu) mg/l, Max	0.05	1.5	-
16	Fluoride (as F) mg/l, Max	1.0	1.5	-
17	Free residual Chlorine, mg/l, Min	0.2	1	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
18	Iron (as Fe) mg/l, max	0.3	No relaxation	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3mg/l
19	Magnesium (as Mg) mg/l, Max	30	100	-
20	Manganese (as Mn) mg/l, Max	0.1	0.3	-
21	Mineral oil, mg/l Max	0.5	No relaxation	-
22	Nitrate (as NO ₃) mg/l, Max	45	No relaxation	-
23	Phenolic compounds (as C ₆ H ₅ OH) mg/l, Max	0.001	0.002	-
24	Selenium (as Se), mg/l, Max	0.01	No relaxation	-
25	Silver (as Ag), mg/l, Max	0.1	No relaxation	-
26	Sulphate (as SO ₄) mg/l, Max	200	400	May be extended to 400 provided that Magnesium does not exceed 30

S. No.	Characteristic	Requirement (Acceptable Limit)	Permissible limit in the absence of alternate source	Remarks
27	Sulphide (as H ₂ S) mg/l, max	0.05	No relaxation	-
28	Total alkalinity as calcium carbonate, mg/l Max	200	600	-
29	Total Hardness (as CaCO ₃) mg/l, Max	200	600	-
30	Zinc (as zn), mg/l, Max	5	15	-
31	Cadmium (as Cd), mg/l, Max	0.003	No relaxation	-
32	Cyanide (as CN), mg/l, Max	0.05	No relaxation	-
33	Lead (as Pb), mg/l, Max	0.01	No relaxation	-
34	Mercury (as Hg) mg/l, Max	0.001	No relaxation	-
35	Molybdenum (as Mo) mg/l, max	0.07	No relaxation	-
36	Nickle (as Ni), mg/l, max	0.02	No relaxation	-
37	Polychlorinated biphenyls, mg/l, max	0.0005	No relaxation	-
38	Polynuclear aromatic hydrocarbons (as PAH) mg/l, Max	0.0001	No relaxation	-
39	Total Arsenic (as As), mg/l, Max	0.01	0.05	-
40	Total Chromium (as Cr) mg/l, Max	0.05	No relaxation	-
41	Trihalomethanes			
	Bromoform, mg/l, max	0.1	No relaxation	
	Dibromochloromethane, mg/l, max	0.1	No relaxation	
	Bromodichloromethane, mg/l, max	0.06	No relaxation	
	Chloroform, mg/l, max	0.2	No relaxation	

S. No.	Characteristic	Requirement (Acceptable Limit)	Permissible limit in the absence of alternate source	Remarks
42	Radioactive materials a) Alpha emitters Bq/l max b) Beta emitters pci/l, Max	0.1 1.0	No relaxation No relaxation	-

Annexure 2.2: Effluent Discharge Standards

S.No.	Parameter	Unit	Effluent Discharge Standards (Inland Surface Water), GoI	Treated Sanitary Sewage Discharges by IFC
1	Colour & Odor	--	All efforts should be made to remove colour and unpleasant odor as far as practicable.	-
2	Suspended Solids Max.	mg/l	100	50
3	Particle size of Suspended Solids	--	Shall pass 850 micron IS Sieve	-
4	pH value	--	5.5 to 9.0	6.0-9.0
5	Temperature, Max.	°C	Shall not exceed 5°C above the receiving water temperature	-
6	Oil and grease, Max.	mg/l	10.0	10.0
7	Total residual Chlorine, Max.	mg/l	1.0	-
8	Ammonical Nitrogen (as N), Max.	mg/l	50	-
9	Total Kjeldah Nitrogen (as N), Max.	mg/l	100	-
10	Free Ammonia (as NH ₃), Max.	mg/l	5	-
11	Biochemical Oxygen Demand (5 days at 20°C), Max.	mg/l	30	30
12	Chemical Oxygen Demand Max.	mg/l	250	125
13	Arsenic (as As), Max.	mg/l	0.2	-
14	Mercury (as Hg), Max.	mg/l	0.01	-
15	Lead (as Pb), Max.	mg/l	0.1	-
16	Cadmium (as Cd), Max.	mg/l	2.0	-
17	Hexavalent Chromium (as Cr ⁺⁶), Max.	mg/l	0.1	-
18	Total Chromium (as Cr) Max.	mg/l	2.0	-
19	Copper (as Cu), Max.	mg/l	3.0	-
20	Zinc (as Zn), Max.	mg/l	5.0	-
21	Selenium (as Se), Max.	mg/l	0.05	-

S.No.	Parameter	Unit	Effluent Discharge Standards (Inland Surface Water), Gol	Treated Sanitary Sewage Discharges by IFC
22	Nickel (as Ni), Max.	mg/l	3.0	-
23	Cyanide (as CN), Max.	mg/l	0.2	-
24	Fluorides (as F), Max.	mg/l	2.0	-
25	Dissolved phosphates (as P), Max.	mg/l	5.0	-
26	Sulphides (as S), Max.	mg/l	2.0	-
27	Phenolic compounds (as C ₆ H ₅ OH), Max.	mg/l	1.0	-
28	Radioactive Materials a Emitters, mcurie/ml, Max. b Emitters, mcurie/ml, Max.	mg/l	10-7 10-6	-
29	Bio-assay test	mg/l	90% survival of fish after 96 hours in 100% effluent	-
30	Manganese (as Mn)	mg/l	2.0	-
31	Iron (as Fe)	mg/l	3.0	-
32	Vanadium (as V)	mg/l	0.2	-
33	Nitrate Nitrogen	mg/l	10.0	-
34	Total Nitrogen	mg/l	-	10.0
35	Total phosphorus	mg/l	-	2.0

Source: Central Pollution Control Board Notification, Gol and General EHS Guidelines: Environmental Wastewater and ambient Water Quality, IFC, 2007

Annexure 2.3: Tolerance Limits for Inland Surface Water Quality

Characteristic	Designated Use Class of Inland Waters				
	A	B	C	D	E
pH value	6.5 to 8.5	6.5 to 8.5	6.5 to 8.5	6.5 to 8.5	6.0 to 8.5
Dissolved Oxygen, mg/l, Min.	6	5	4	4	-
Biochemical Oxygen Demand (5 days at 20°C), mg/l	2	3	3	-	-
Total coliform organisms, MPN/100 ml. Max.	50	500	5000	-	-
Colour Hazen units	10	300	300	-	-
Chlorides (as Cl), mg/l Max.	250	-	600	-	600
Sodium Adsorption ratio Max.	-	-	-	-	26
Boron (as B), mg/l. Max.	-	-	-	-	2
Sulphates (as SO ₄), mg/l	400	-	400	-	1000
Nitrates (as NO ₃), mg/l Max.	20	-	50	-	-
Free Ammonia (as NH ₃), mg/l	-	-	-	1.2	-
Conductivity at 25° C microhm / cm Max.	-	-	-	1000	2250
Arsenic (as As), mg/l. Max.	0.05	0.2	0.2	-	-
Iron (as Fe), mg/l	0.3	-	50	-	-
Fluorides (as F), mg/l	1.5	1.5	1.5	-	-
Lead (as Pb), mg/l. Max.	0.1	-	0.1	-	-
Copper (as Cu), mg/l	1.5	-	1.5	-	-
Zinc (as Zn) mg/l/ Max.	1.5	-	1.5	-	-
Manganese (as Mn), mg/l	0.5	-	-	-	-
Total Dissolved Solids, mg/l	500	-	1500	-	2100
Total Hardness (CaCO ₃), mg/l	300	-	-	-	-
Magnesium (as Mg), mg/l	100	-	-	-	-
Chlorides (as Cl), mg/l	250	600	-	-	600
Cyanides (as CN), mg/l	0.05	0.05	0.05	-	-

A: Drinking Water Source without conventional treatment but after disinfections;

B: Outdoor bathing organized;

C: drinking water source with conventional treatment followed by disinfections;

D: propagation of wildlife and fisheries;

E: irrigation, industrial cooling, controlled waste disposal.

Source: Central Pollution Control Board

Annexure 2.4: Ambient Air Quality Standards

Pollutant	National Ambient Air Quality Standards, GoI			Air Quality Standards by IFC	
	Time Weighted Average	Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area (notified by Central Government)	Averaging Period	Guideline Value in $\mu\text{g}/\text{m}^3$
Sulphur Dioxide (SO_2), $\mu\text{g}/\text{m}^3$	Annual	50	20	10 minute	500
	24 Hours**	80	80	24-Hour	20
Nitrogen Dioxide as NO_2 , $\mu\text{g}/\text{m}^3$	Annual	40	30	1-Year	40
	24 Hours**	80	80	1-Hour	200
Particulate Matter (size less than $10\mu\text{m}$) or PM_{10} $\mu\text{g}/\text{m}^3$	Annual	60	60	1-Year	20
	24 Hours**	100	100	24-Hour	50
Particulate Matter (size less than $2.5\mu\text{m}$) or $\text{PM}_{2.5}$ $\mu\text{g}/\text{m}^3$	Annual *	40	40	1-Year	10
	24 Hours**	60	60	24-Hour	25
Ozone (O_3) $\mu\text{g}/\text{m}^3$	8 hours**	100	100	8-Hour daily maximum	100
	24 Hours**	180	180	-	-
Lead (Pb) $\mu\text{g}/\text{m}^3$	Annual *	0.50	0.50	-	-
	24 Hours**	1.0	1.0	-	-
Carbon Monoxide (CO) mg/m^3	8 Hours**	02	02	-	-
	1 Hour**	04	04	-	-
Ammonia (NH_3) $\mu\text{g}/\text{m}^3$	Annual *	100	100	-	-
	24 Hours**	400	400	-	-
Benzene (C_6H_6) $\mu\text{g}/\text{m}^3$	Annual *	05	05	-	-
Benzo (a) pyrene	Annual *	01	01	-	-

Pollutant	National Ambient Air Quality Standards, GoI			Air Quality Standards by IFC	
	Time Weighted Average	Industrial, Residential, Rural & Other Area	Ecologically Sensitive Area (notified by Central Government)	Averaging Period	Guideline Value in $\mu\text{g}/\text{m}^3$
(BaP)particulate phase only ng/m^3					
Arsenic (AS) ng/m^3	Annual *	06	06	-	-
Nickle (Ni) ng/m^3	Annual *	20	20	-	-

Source: Central Pollution Control Board Notification dated 18th November 2009, GoI and General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality, IFC, 2007

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week hourly at uniform intervals, ** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Annexure 2.5: National Ambient Noise Standards

Category of Zones	National Ambient Noise Standards, GoI		Noise Standards by IFC	
	Leq in dB (A)		One Hour LAeq (dBA)	
	Day Time 6.00 AM to 10.00 PM	Night Time 10.00 PM to 6.00 PM	Day Time 7.00 AM to 10.00 PM	Night Time 10.00 PM to 7.00 PM
Industrial	75	70	70	70
Commercial	65	55		
Residential	55	45	55	45
Silence Zone: Institutional, Educational	50	40		

Source: Central Pollution Control Board, GoI and
General EHS Guidelines: Environmental Noise Management, IFC, 2007

1. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
2. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period

Annexure 4.1: List of Trees to be Cut/Transplant

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
1	Mumbai Central	<i>Ficus glomerata</i>	1	80	10	-	1
		<i>Cocos nucifera</i>	1	60	14	1	-
		<i>Plameria rubra</i>	2	60	6	-	2
2	Kandivali	<i>Ficus religiosa</i>	1	180	14	1	-
		<i>Zizyphusmarutiana</i>	1	150	12	1	-
		<i>Dalbergia shisoo</i>	3	120	12	3	-
		<i>Syzygiumcumini</i>	1	240	14	1	-
		<i>Mangifera indica</i>	1	60	6	-	1
		<i>Pongamia pinnata</i>	4	150	14	4	-
		<i>Albizia lebbeck</i>	2	60	12	-	2
		<i>Ficus glomerata</i>	1	140	12	1	-
		<i>Ficus religiosa</i>	1	150	14	1	-
		<i>Ficus glomerata</i>	5	110	12	5	-
		<i>Syzygiumcumini</i>	3	80	12	-	3
		<i>Polyalthia longifolia</i>	2	60	6	-	2
3	Nallasopara		0				
4	Mullund	<i>Ficus Religiosa</i>	1	400	10	1	
		<i>Junglee</i>	1	106	20	1	
		<i>Junglee</i>	1	200	15	1	
		<i>Ficus Religiosa</i>	1	200	15	1	
		<i>Ashoka Tree</i>	1	135	12	1	
		<i>Azadirachta Indica</i>	1	125	20	1	
		<i>Drum Strick</i>	1	80	7		1
		<i>Black Plum</i>	1	185	10	1	
		<i>Junglee</i>	1	195	15	1	
		<i>Ficus Religiosa</i>	1	400	20	1	
		<i>Tectona grandis</i>	1	40	9		1

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Ficus Racemosa</i>	1	95	3		1
		<i>Ficus Religiosa</i>	1	300	20	1	
		<i>Ficus Racemosa</i>	1	130	13	1	
		<i>Tectona grandis</i>	1	50	20		1
		<i>Jungalee</i>	1	190	25	1	
		<i>Ficus Riligiosa</i>	1	200	10	1	
		<i>Jungalee</i>	1	145	25	1	
		<i>Jungalee</i>	1	145	20	1	
		<i>Ficus Racemosa</i>	1	200	7	1	
		<i>Drum Strick</i>	1	105	6	1	
		<i>Ziziphus Mauritiana</i>	1	250	15	1	
		<i>Tectona grandis</i>	1	50	10		1
		<i>Ficus Recemosa</i>	1	90	10		1
		<i>Ficus Religiosa</i>	1	250	20	1	
		<i>Ficus Recemosa</i>	1	100	10	1	
		<i>Black Plum</i>	1	150	15	1	
		<i>Ashoka Tree</i>	1	110	25	1	
		<i>Ashoka Tree</i>	1	121	20	1	
		<i>Ficus Racemosa</i>	1	130	25	1	
		<i>Ashoka Tree</i>	1	160	20	1	
		<i>Ashoka Tree</i>	1	200	10	1	
		<i>Ashoka Tree</i>	1	210	20	1	
		<i>Ficus Racemosa</i>	1	90	25		1
		<i>Ficus Religiosa</i>	1	270	15	1	
		<i>Black Plum</i>	1	250	15	1	
		<i>Ficus Racemosa</i>	1	20	10		1
		<i>Ficus Racemosa</i>	1	140	12	1	
		<i>Ficus Racemosa</i>	1	125	20	1	
		<i>Ficus Religiosa</i>	1	125	20	1	

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Azadirachta Indica</i>	1	130	25	1	
		<i>Ashoka Tree</i>	1	180	20	1	
		<i>Juglee</i>	1	185	6	1	
		<i>Mango Tree</i>	1	90	20		1
		<i>Juglee</i>	1	250	10	1	
		<i>Junglee</i>	1	200	20	1	
5	Bhandup	<i>Ficus religiosa</i>	1	60	10	1	-
		<i>Terminalia catapa</i>	2	80	14	2	-
		<i>Albizia lebbek</i>	4	60	8	4	-
6	GTB Nagar	<i>Syzygiumcumini</i>	1	110	12	1	
		<i>Terminalia catapa</i>	1	90	12	-	1
		<i>Bombax ceiba</i>	2	45	12	-	2
		<i>Leucaena leucocephala</i>	1	60	12		1
7	Chembur station	<i>Syzygiumcumini</i>	1	90	12		1
		<i>Casuarina equisetifolia</i>	1	90	14		1
		<i>Ficus religiosa</i>	1	360	14	1	-
8	Govandi station	<i>Holoptelea integrifolia</i>	2	60	12		2
		<i>Samania saman</i>	3	180	14	3	-
		<i>Zizyphusmarutiana</i>	3	40	4		3
9	Mankhurd station	<i>Ficus glomerata</i>	1	60	10	-	1
		<i>Ficus religiosa</i>	1	90	12	-	1
		<i>Caesalpinia sp</i>	10	60	10	-	10
10	Neral station	<i>Junglee</i>	1	180	10	1	
		<i>Junglee</i>	1	105	8	1	
		<i>Junglee</i>	1	120	8	1	
		<i>Ficus bengalensis</i>	1	150	9	1	
		<i>Mangifera indica</i>	1	100	10	1	
		<i>Mangifera indica</i>	1	153	10	1	
		<i>Mangifera indica</i>	1	140	12	1	

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Mangifera indica</i>	1	50	12		1
		Junglee	1	170	12	1	
		<i>Mangifera indica</i>	1	80	14		1
		<i>Ficus Religiosa</i>	1	690	14	1	
		<i>Ficus Religiosa</i>	1	100	12	1	
		Junglee	1	140	8	1	
		<i>Mangifera indica</i>	1	80	9		1
		Junglee	1	250	12	1	
		<i>Mangifera indica</i>	1	120	12	1	
		Junglee	1	130	12	1	
		<i>Mangifera indica</i>	1	200	15	1	
		<i>Syzygiumcumini</i>	1	130	15	1	
		<i>Mangifera indica</i>	1	120	15	1	
		<i>Mangifera indica</i>	1	120	12	1	
		Junglee	1	80	15		1
		<i>Millettia Pinnata</i>	1	150	8	1	
		<i>Tamarindus indica</i>	1	180	14	1	
		<i>Tamarindus indica</i>	1	160	14	1	
		<i>Pithecellobium Dulce</i>	1	80	12		1
		Junglee	1	260	11	1	
		Junglee	1	50	10		1
		<i>Millettia Pinnata</i>	1	40	8		1
		Junglee	1	230	12	1	
		Junglee	1	160	12	1	
		Junglee	1	200	12	1	
		<i>Ficus bengalensis</i>	1	260	10	1	
		Junglee	1	50	7		1
		<i>Pithecellobium Dulce</i>	1	50	11		1
		<i>Ficus Religiosa</i>	1	100	12	1	

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Junglee</i>	1	80	10		1
		<i>Ficus Racemosa</i>	1	320	12	1	
		<i>Ficus Racemosa</i>	1	180	14	1	
		<i>Millettia Pinnata</i>	1	120	7	1	
		<i>Pithecellobium Dulce</i>	1	50	7		1
		<i>Junglee</i>	1	200	12	1	
		<i>Azadirachta Indica</i>	1	80	10		1
		<i>Syzygiumcumini</i>	1	170	12	1	
		<i>Ceiba pentandra</i>	1	120	14	1	
		<i>Junglee</i>	1	40	8		1
		<i>Azadirachta Indica</i>	1	220	12	1	
		<i>Azadirachta Indica</i>	1	170	14	1	
		<i>Millettia Pinnata</i>	1	70	10		1
		<i>Junglee</i>	1	50	8		1
		<i>Azadirachta Indica</i>	1	210	14	1	
		<i>Junglee</i>	1	180	12	1	
		<i>Azadirachta Indica</i>	1	270	11	1	
		<i>Junglee</i>	1	15	5		1
		<i>Syzygiumcumini</i>	1	200	12	1	
		<i>Syzygiumcumini</i>	1	90	11		1
		<i>Syzygiumcumini</i>	1	220	12	1	
		<i>Mangifera indica</i>	1	180	12	1	
		<i>Mangifera indica</i>	1	150	13	1	
		<i>Mangifera indica</i>	1	170	15	1	
		<i>Mangifera indica</i>	1	220	13	1	
		<i>Mangifera indica</i>	1	280	12	1	
		<i>Junglee</i>	1	80	10		1
		<i>Annona reticulata</i>	1	40	12		1
		<i>Annona reticulata</i>	1	30	6		1

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Annona reticulata</i>	1	25	5		1
		<i>Azadirachta Indica</i>	1	140	12	1	
		<i>Azadirachta Indica</i>	1	220	12	1	
		<i>Junglee</i>	1	80	8		1
		<i>Junglee</i>	1	70	10		1
		<i>Junglee</i>	1	340	12	1	
		<i>Junglee</i>	1	240	13	1	
		<i>Junglee</i>	1	220	10	1	
		<i>Junglee</i>	1	222	12	1	
		<i>Junglee</i>	1	90	10		1
		<i>Junglee</i>	1	30	16		1
		<i>Junglee</i>	1	50	12		1
		<i>Junglee</i>	1	25	5		1
		<i>Annona reticulata</i>	1	150	13	1	
		<i>Mangifera indica</i>	1	50	8		1
		<i>Mangifera indica</i>	1	40	6		1
		<i>Mangifera indica</i>	1	110	14	1	
		<i>Junglee</i>	1	150	13	1	
		<i>Psidium Guava</i>	1	40	6		1
		<i>Junglee</i>	1	160	12	1	
		<i>Junglee</i>	1	50	5		1
		<i>Mangifera indica</i>	1	40	6		1
		<i>Annona reticulata</i>	1	20	4		1
		<i>Junglee</i>	1	250	14	1	
		<i>Ficus Racemosa</i>	1	360	13	1	
		<i>Psidium guava</i>	1	70	8		1
		<i>Tamarindus indica</i>	1	230	14	1	
		<i>Syzygiumcumini</i>	1	240	14	1	
		<i>Azadirachta Indica</i>	1	240	12	1	

S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
		<i>Junglee</i>	1	180	10	1	
		<i>Junglee</i>	1	40	8		1
		<i>Junglee</i>	1	20	7		1
		<i>Pithecellobium Dulce</i>	1	70	10		1
		<i>Pithecellobium Dulce</i>	1	220	12	1	
		<i>Black Plum</i>	1	180	14	1	
		<i>Pithecellobium Dulce</i>	1	140	8	1	
		<i>Mangifera indica</i>	1	160	13	1	
		<i>Syzygiumcumini</i>	1	140	8	1	
		<i>Syzygiumcumini</i>	1	130	10	1	
		<i>Pithecellobium Dulce</i>	1	70	5		1
		<i>Ficus Racemosa</i>	1	220	12	1	
		<i>Mangifera indica</i>	1	50	8		1
		<i>Junglee</i>	1	60	6		1
		<i>Pithecellobium Dulce</i>	1	120	8	1	
		<i>Ficus Religiosa</i>	1	500	12	1	
		<i>Junglee</i>	1	640	12	1	
		<i>Junglee</i>	1	170	14	1	
		<i>Ficus Religiosa</i>	1	630	14	1	
		<i>Junglee</i>	1	430	13	1	
		<i>Ficus Racemosa</i>	1	80	6		1
		<i>Junglee</i>	1	60	7		1
		<i>Junglee</i>	1	100	7	1	
		<i>Mangifera indica</i>	1	130	12	1	
		<i>Pithecellobium Dulce</i>	1	40	8		1
		<i>Junglee</i>	1	200	12	1	
		<i>Junglee</i>	1	250	10	1	
		<i>Junglee</i>	1	260	13	1	
11	Kasara	<i>Pongamia pinnata</i>	2	80	12	2	-

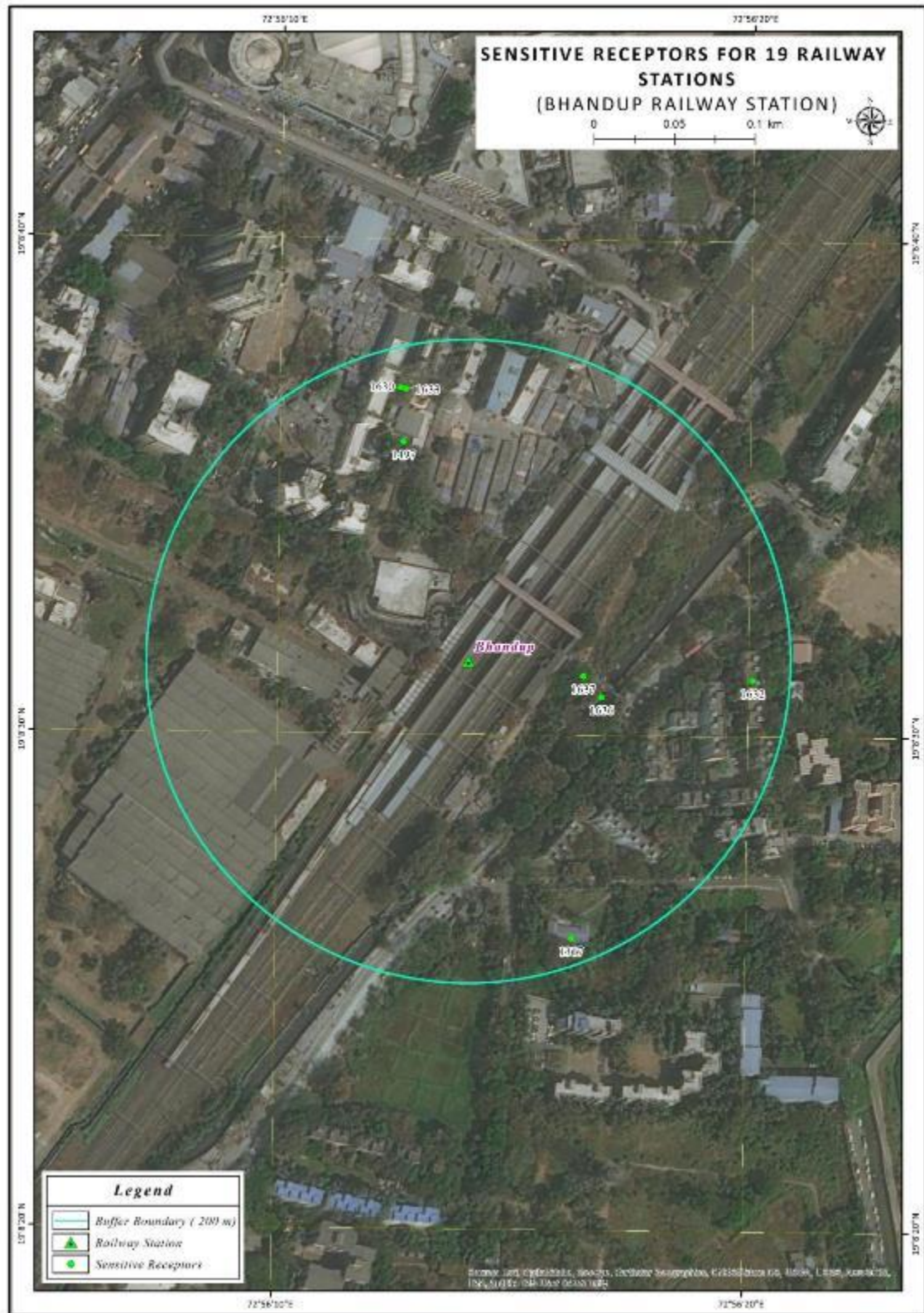
S.No.	Station Name	Tree Botanical Name	Number of Trees	Girth	Height	Cut	Transplant
12	Dombivali	<i>Terminalia catapa</i>	1	80	12	-	1
		<i>Polyalthia longifolia</i>	3	60	14	-	3
		<i>Delonix regia</i>	6	80	14	-	6
13	Vasai road		0				
14	Bhayander station	<i>Neolamarckiacadamba</i>	1	120	12	1	-
15	Mira road station	<i>Azadirachta indica</i>	1	80	10	-	1
		<i>Albizia lebbek</i>	1	80	10	-	1
		<i>Neolamarckiacadamba</i>	1	45	6	-	1
		<i>Cassia siamea</i>	4	60	10	4	-
16	Ghatkopar station	<i>Alobizzialebbeck</i>	1	50	10	-	1
		<i>Alobizzialebbeck</i>	1	40	10	-	1
17	Santacruz station		0				
	Trees cut /transplant					153	101
	Total Trees		254				

Source: Field Survey by RITES Team

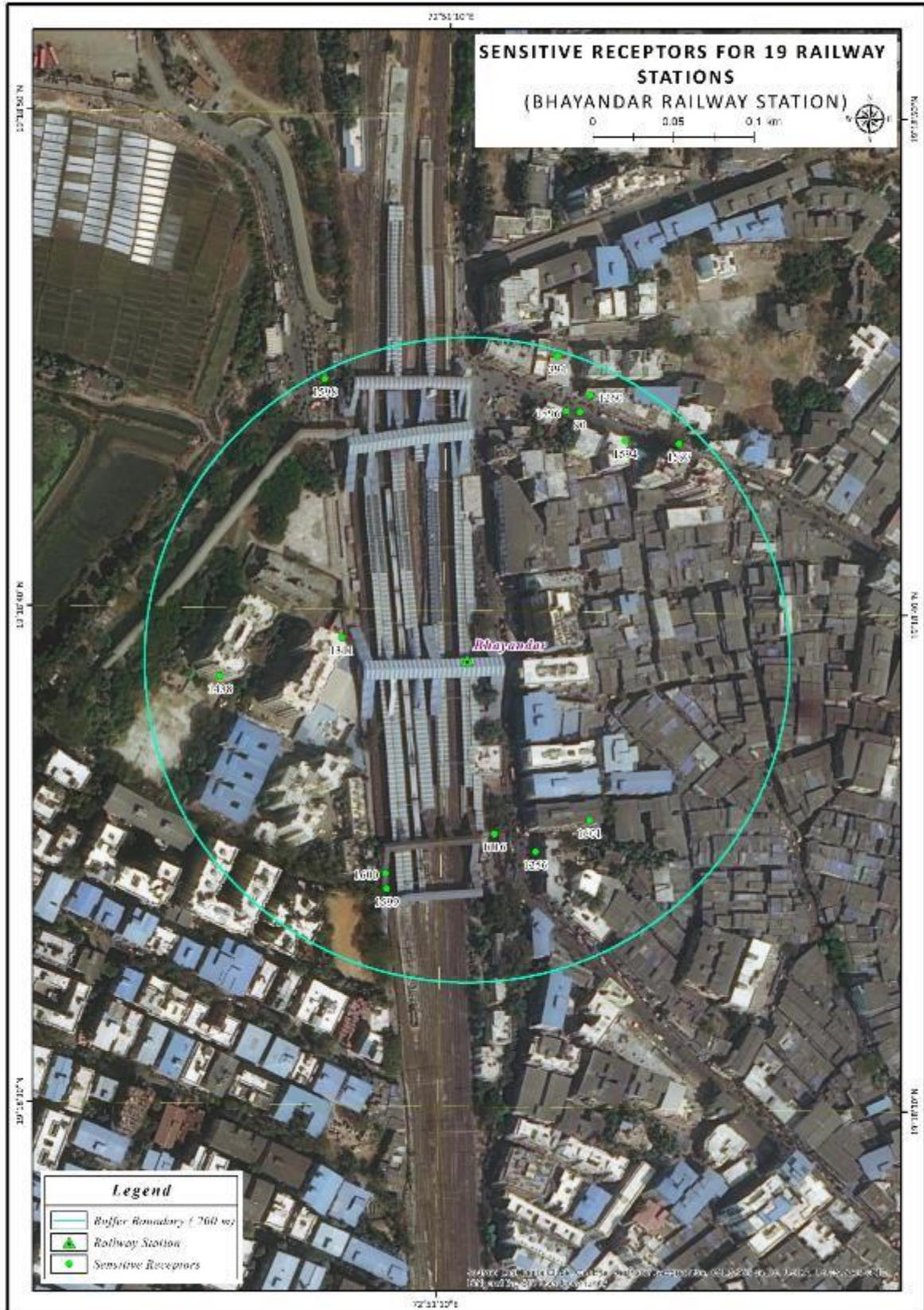
Annexure 4.2: Common and Local Name of Trees in the Study Area

S. NO	BOTANICAL NAME	COMMON NAME	LOCAL NAME
1.	<i>Ficus religiosa</i>	Sacred fig	Pimpal
2.	<i>Samanea saman</i>	Indian rain tree	Indian rain tree
3.	<i>Artocarpus heterophyllus</i>	Katahal	Fanas
4.	<i>Zizyphusmarutiana</i>	Chinese date	Bor
5.	<i>Dalbergia shisoo</i>	North Indian rosewood	Shisam
6.	<i>Syzygiumcumini</i>	Black plum	Jamun
7.	<i>Mangifera indica</i>	Mango	Amba
8.	<i>Pongamia pinnata</i>	Pongame Oil Tree	Karanj
9.	<i>Albizia lebbek</i>	woman's tongue tree	Siris
10.	<i>Ficus glomerata</i>	Cluster fig tree	Gular
11.	<i>Polyalthia longifolia</i>	False Ashoka	Khotaasoka
12.	<i>Leucaena leucocephala</i>	Cow Tamarind	Subabool
13.	<i>Terminalia catapa</i>	Indian Almond	Jangalibadam
14.	<i>Bombax ceiba</i>	Silk Cotton Tree	Katesawar
15.	<i>Neolamarckiacadamba</i>	Burflower-tree	Kadam
16.	<i>Pithecelobium dulce</i>	Sweet tamarind	Chinchbhilai
17.	<i>Tectona grandis</i>	Teak	Sagwan
18.	<i>Azadirachta indica</i>	Margosa tree	Neem
19.	<i>Bauhinia racemosa</i>	Bidi Leaf Tree	Apata
20.	<i>Cassia auriculata</i>	Tanner's Cassia	Tarwad
21.	<i>Delonix regia</i>	flamboyant	Gulmohar
22.	<i>Ficus benghalensis</i>	Indian banyan	Vad

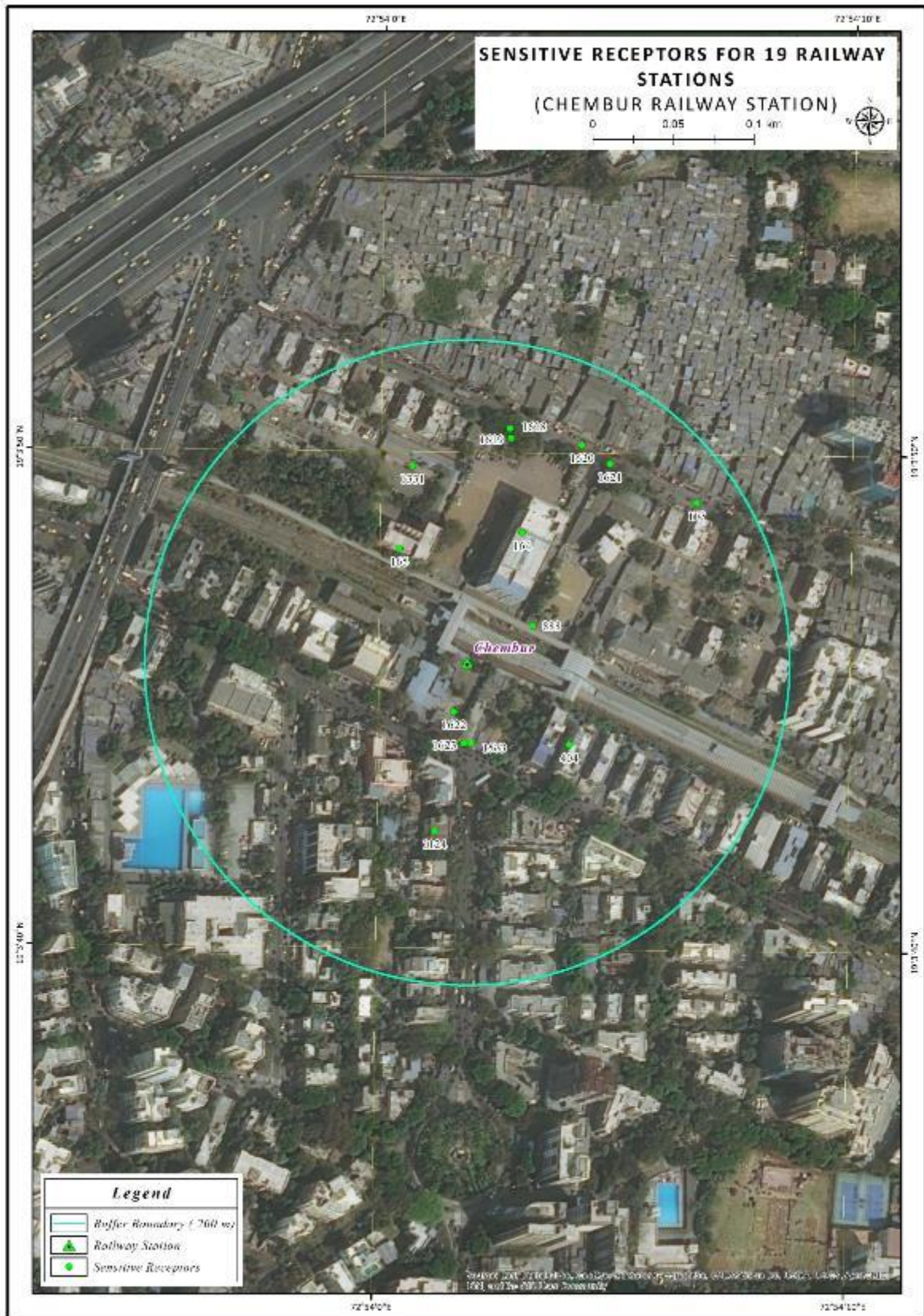
Annexure 4.3: Environmental and Social features



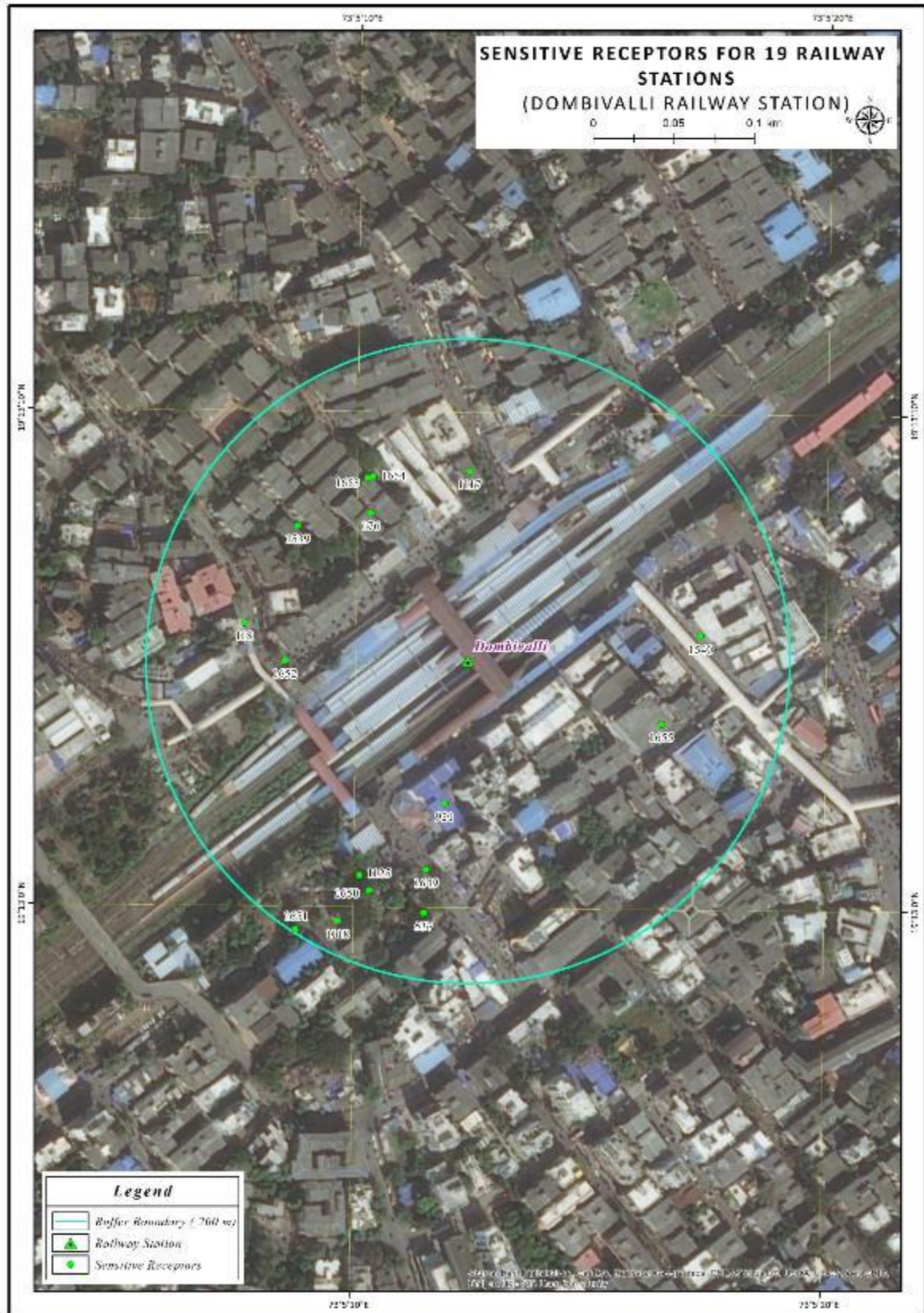
Bhandup Station



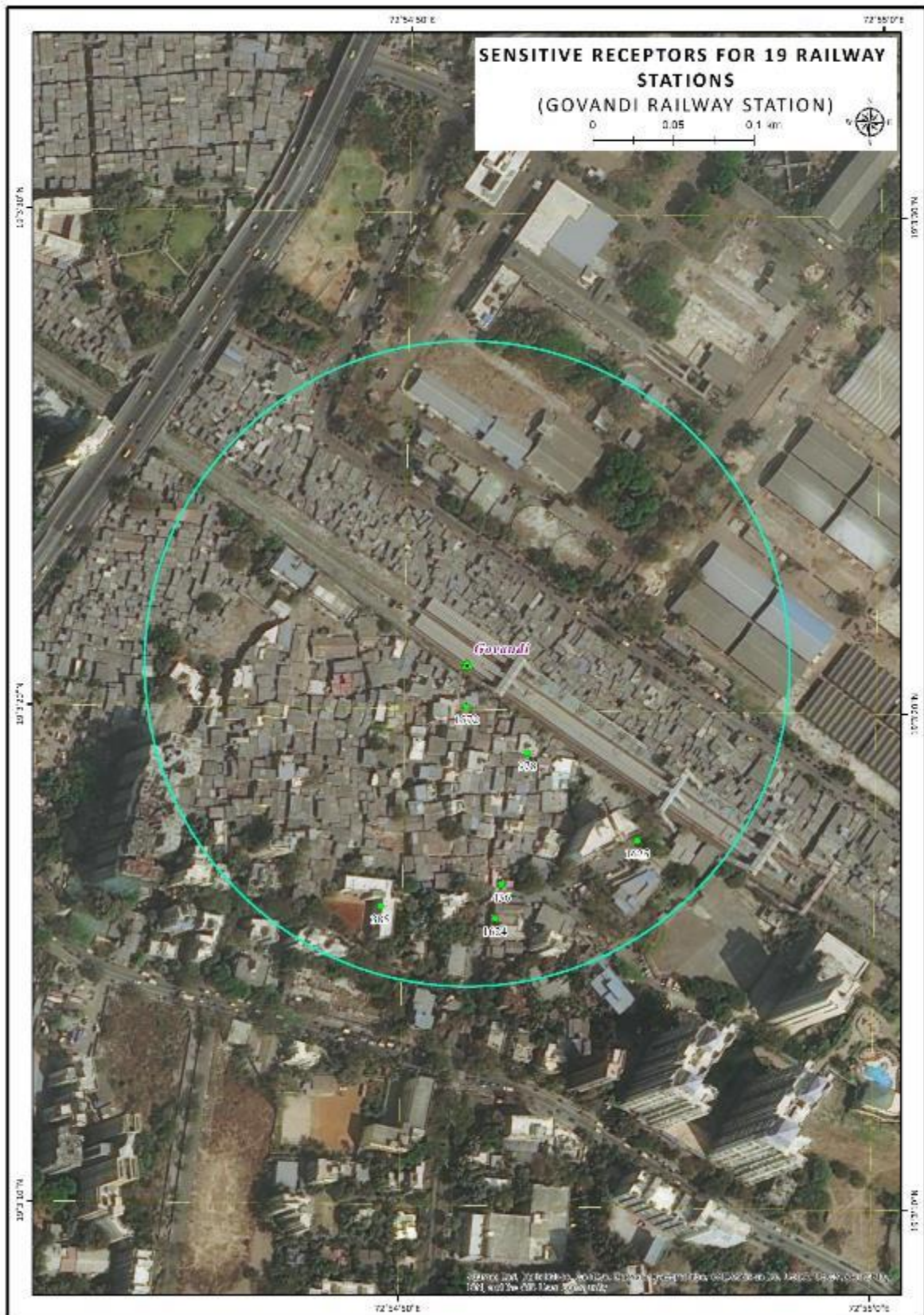
Bhayandar Station



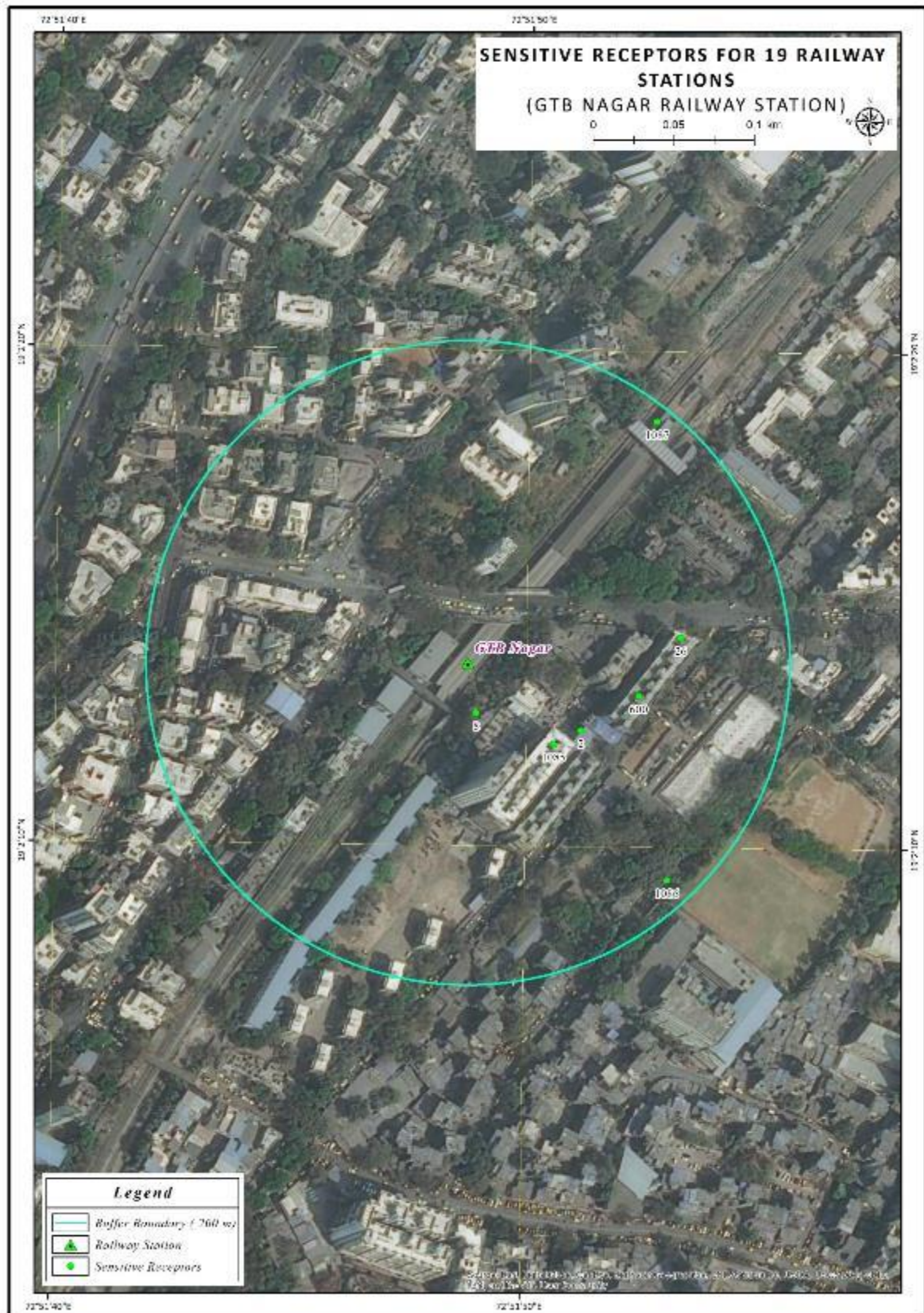
Chembur Station



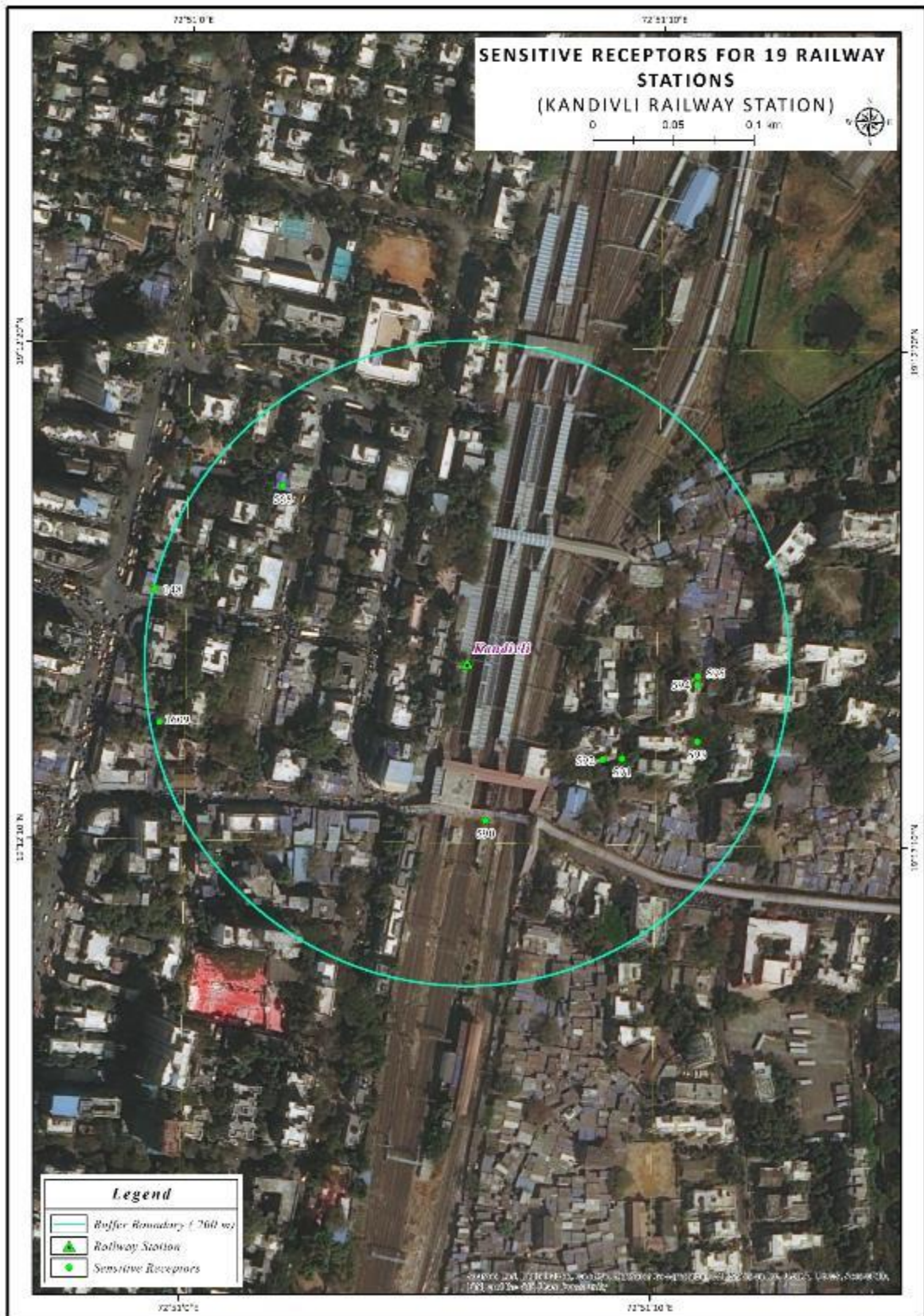
Dombivli Station



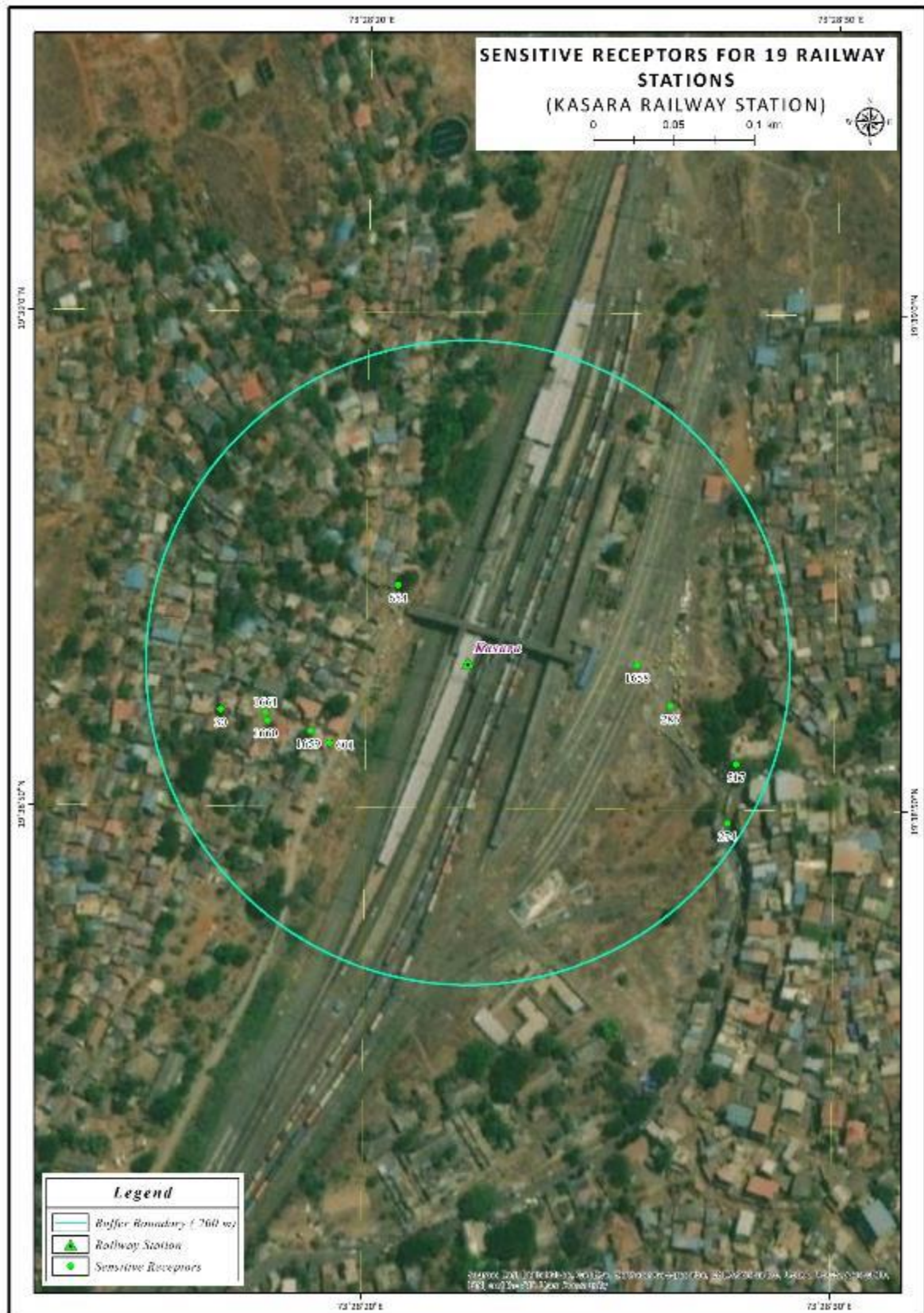
Govandi Station



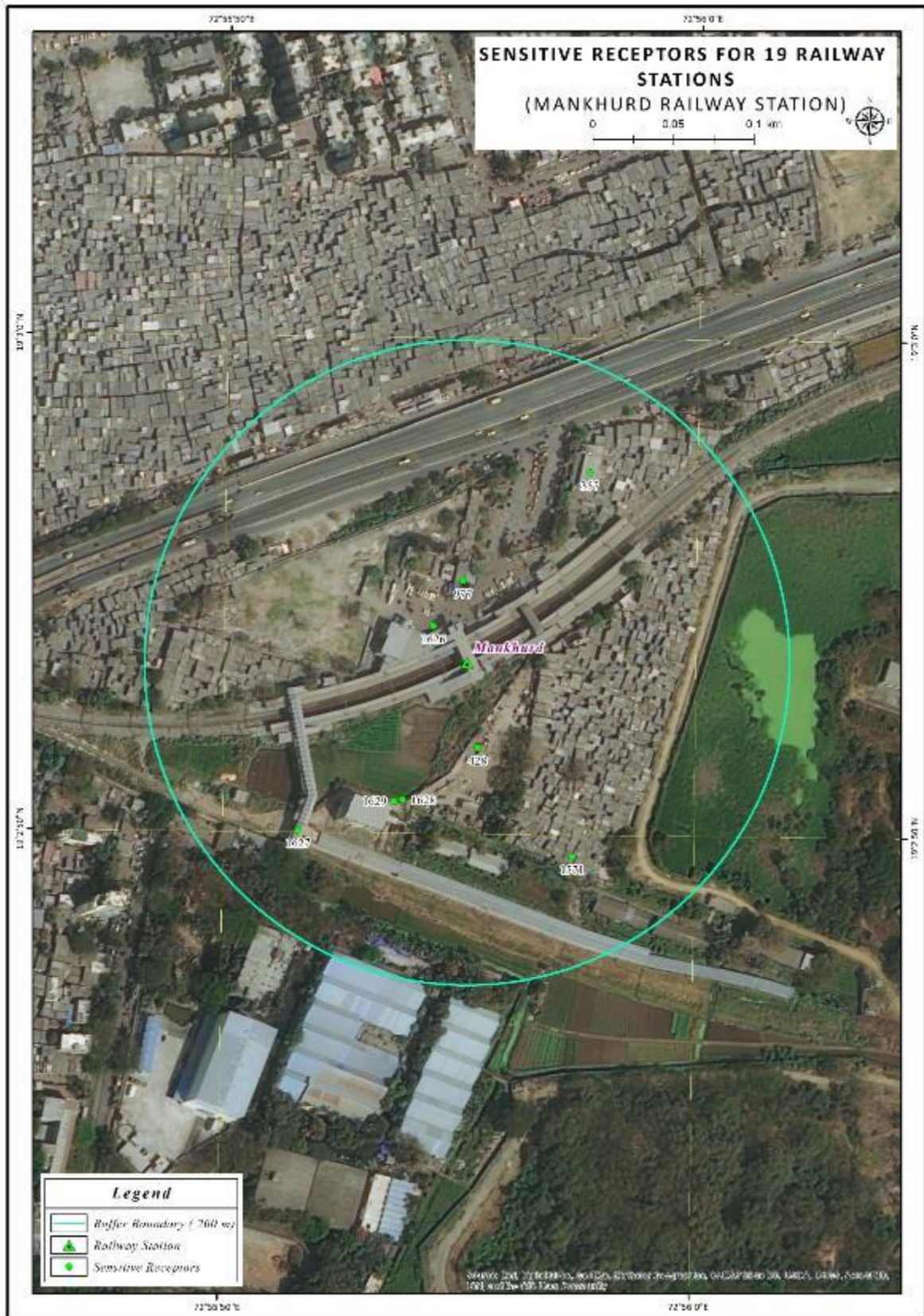
GTB Nagar Station



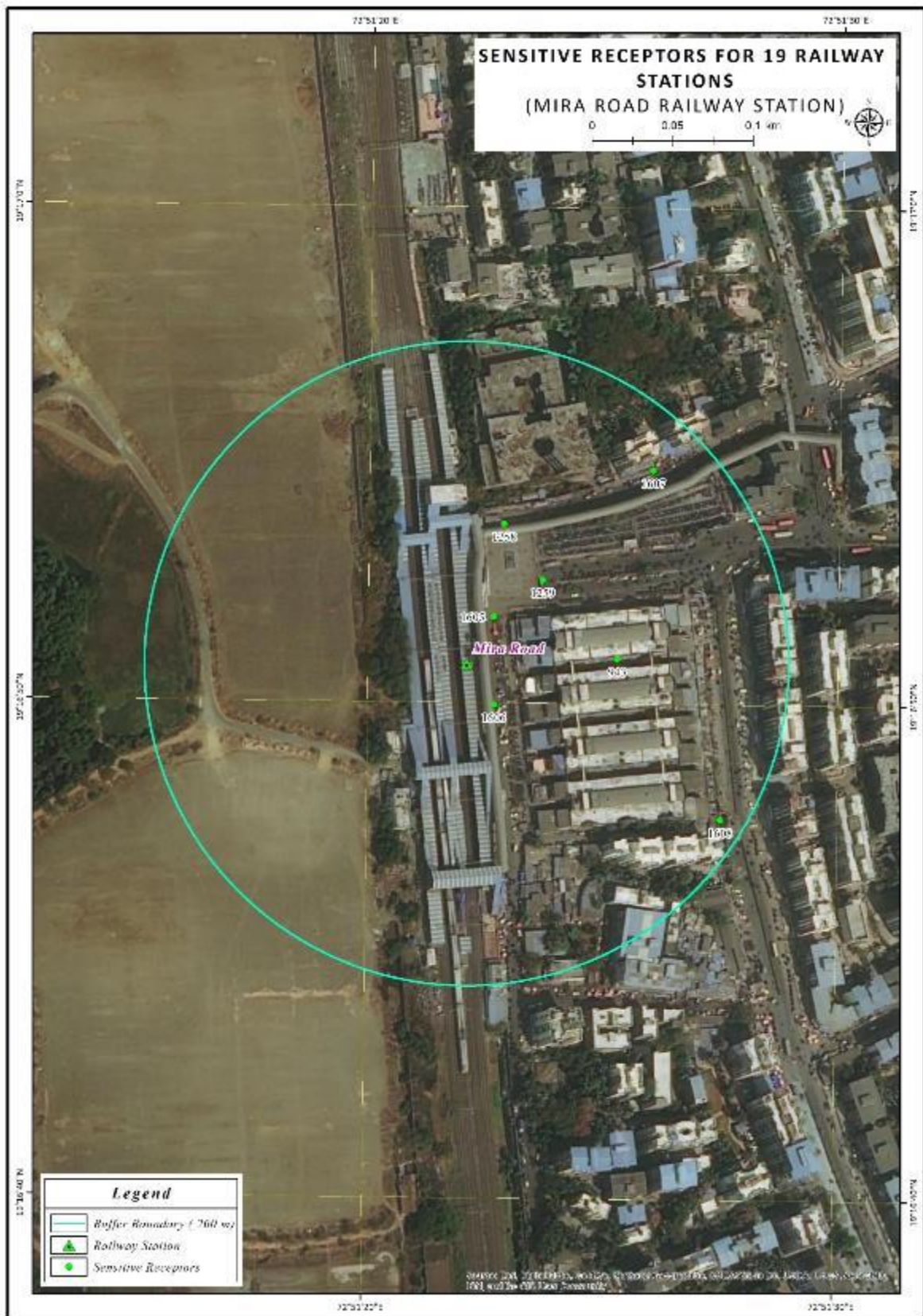
Kandivli Station



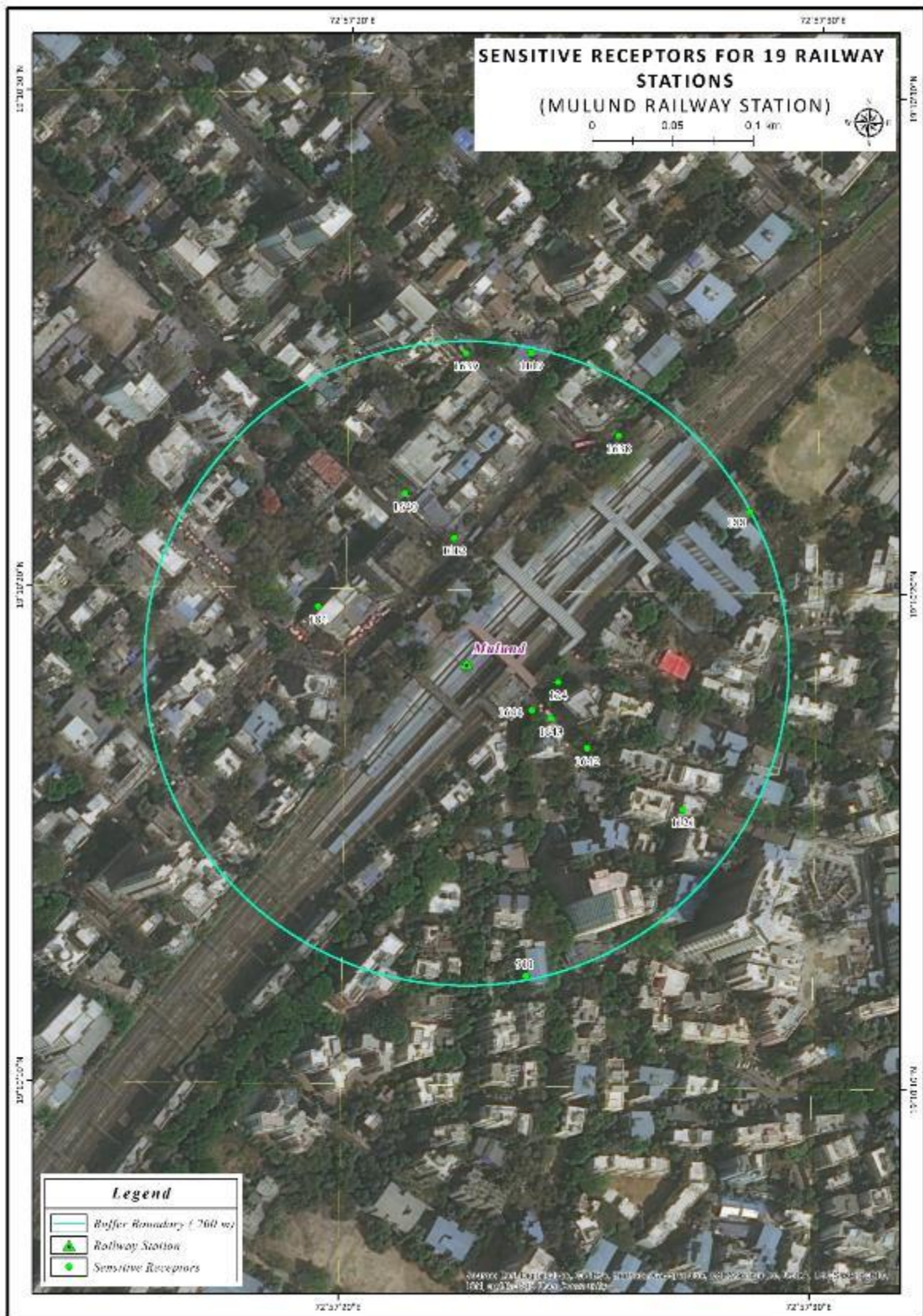
Kasara Station



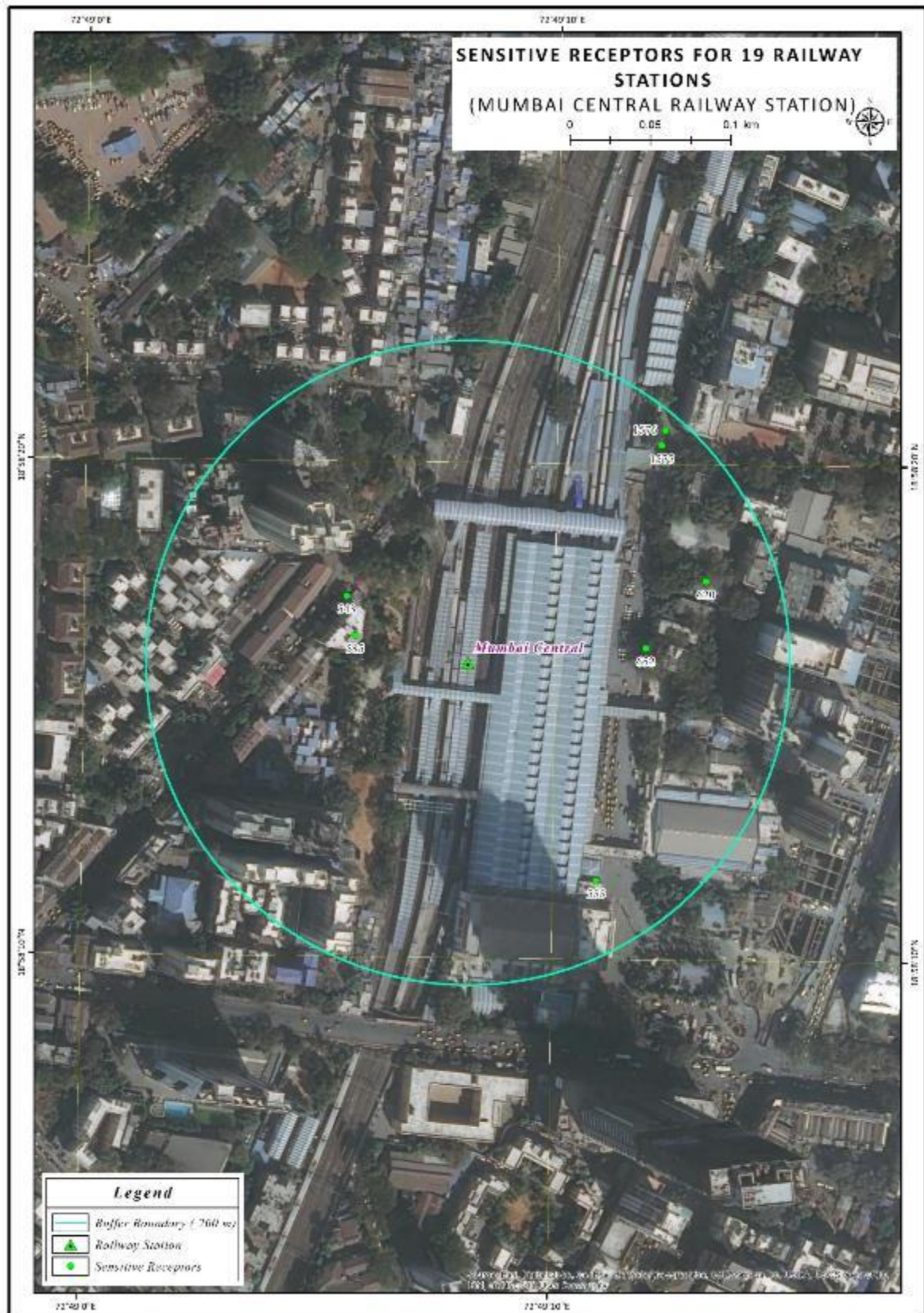
Mankhurd Station



Mira Road Station



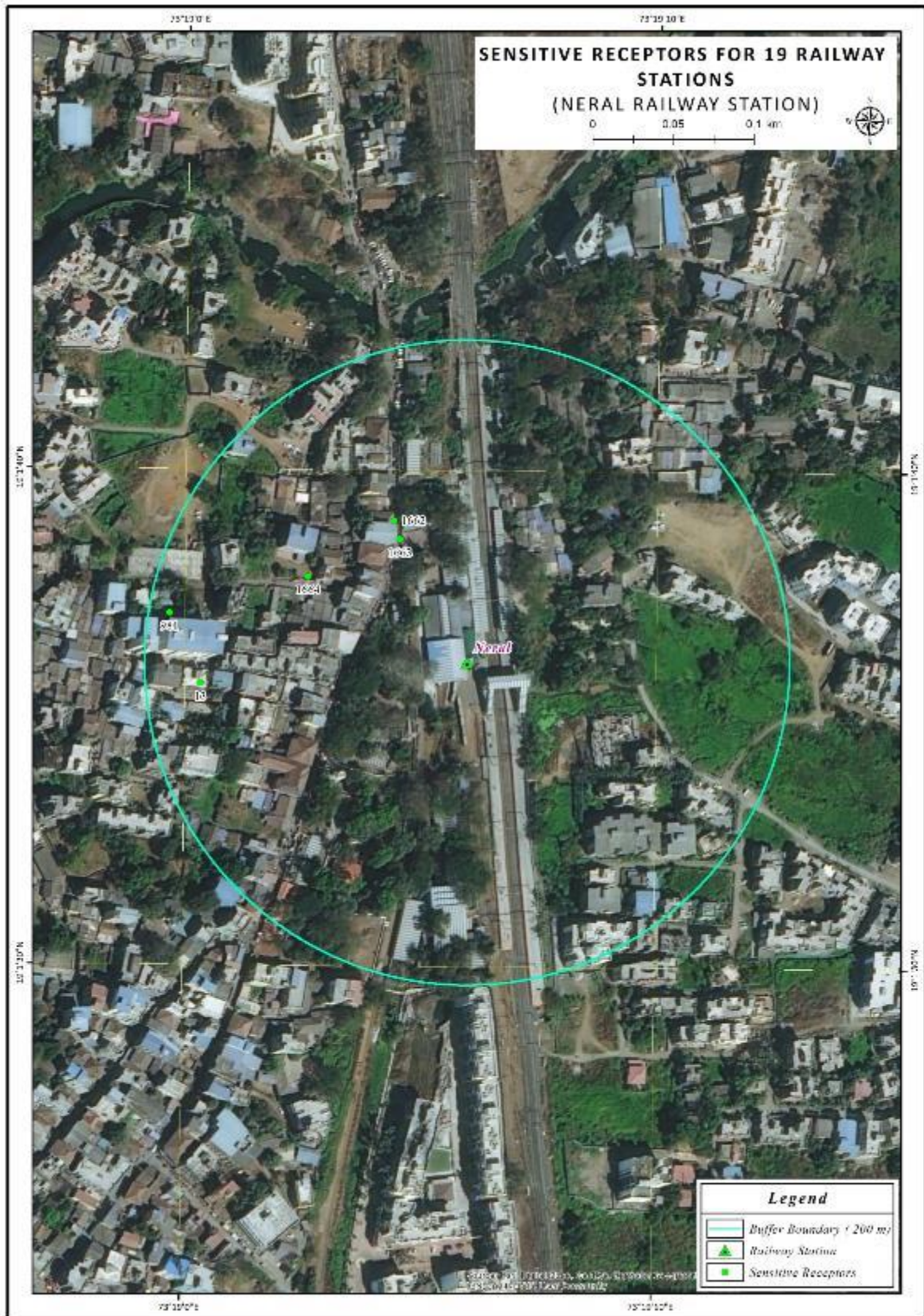
Mulund Station



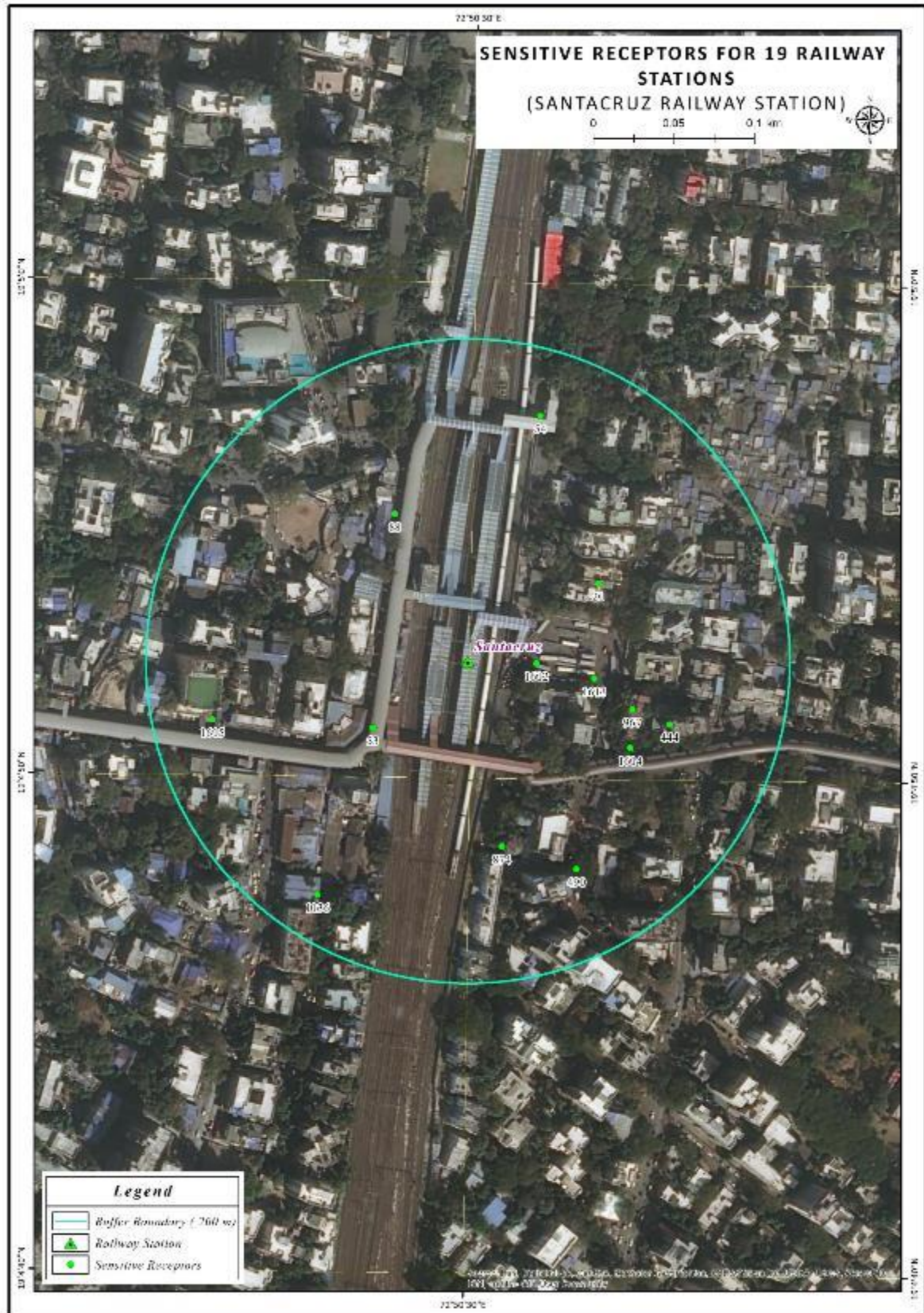
Mumbai Central Station



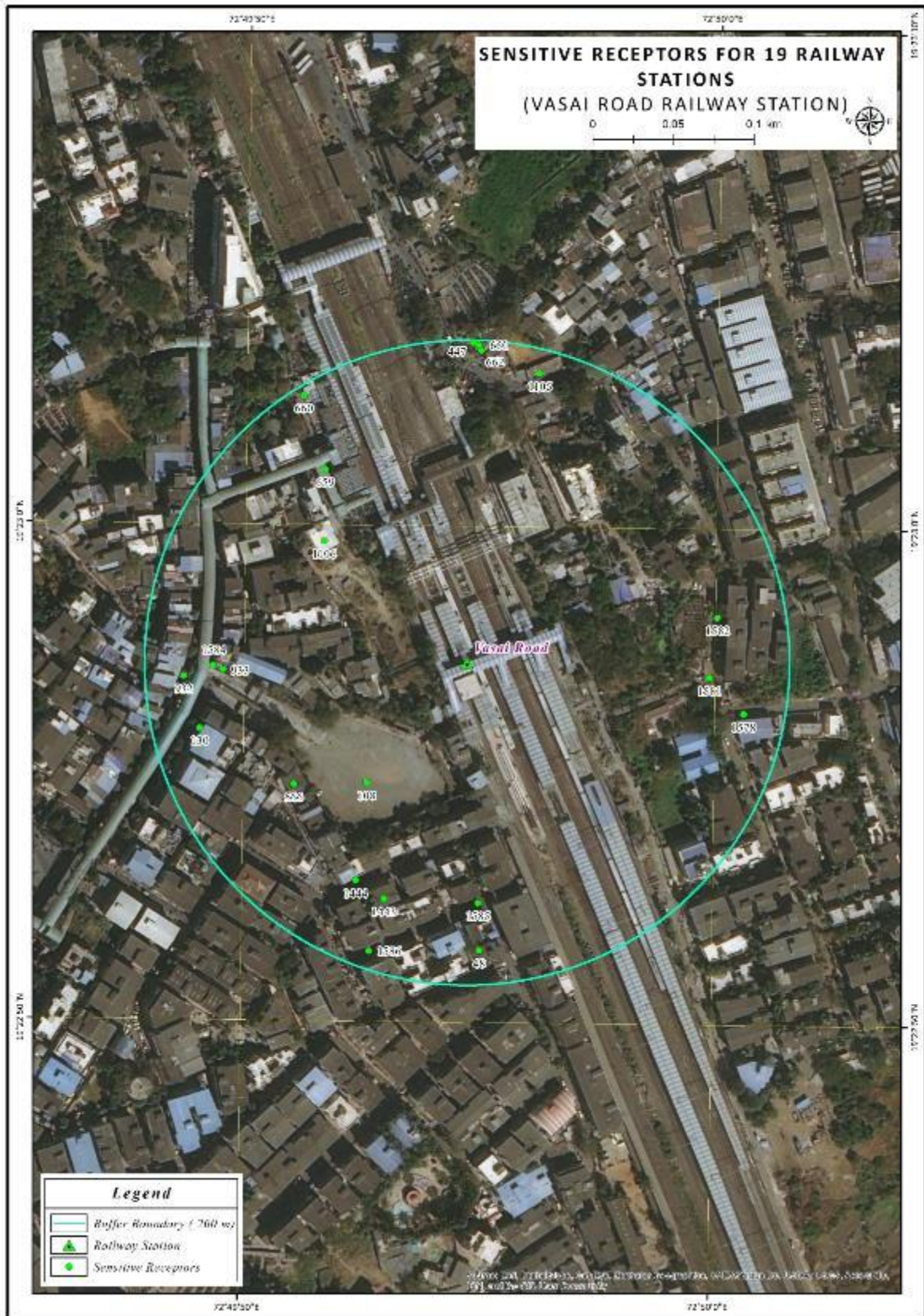
Nalla Sopara Station



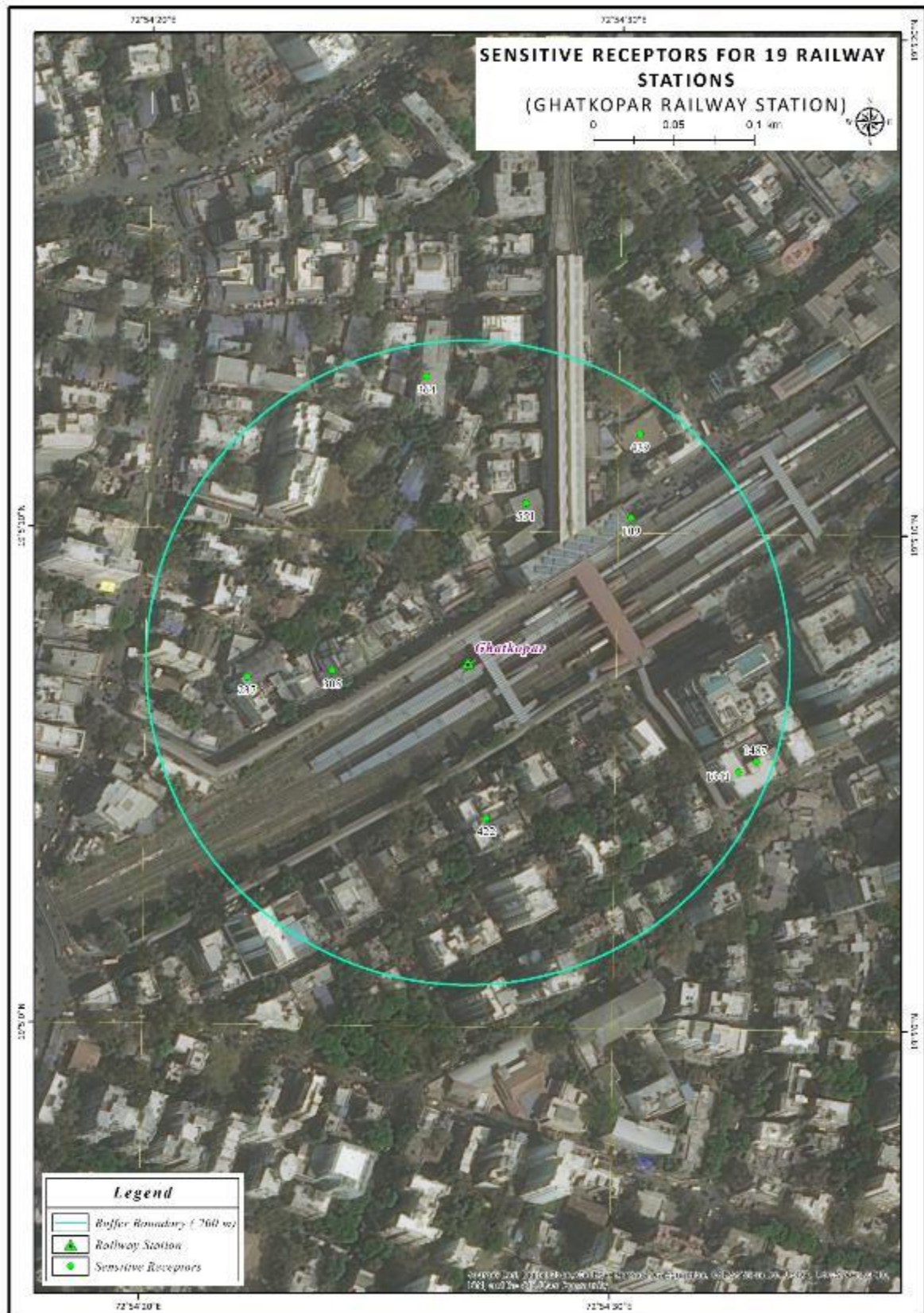
Neral Station



Santacruz Station



Vasai Road Station



Ghatkopar Station

Annexure 4.4:STATIONWISE PHOTOS OF SENSITIVE RECEPTORS (EDUCATIONAL, RELIGIOUS & MEDICAL)

Bhandup Station



Mahadev Mandir -1630

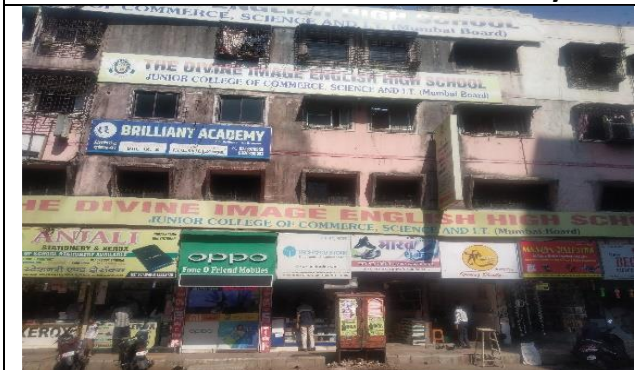


Krishna Mandir -1637

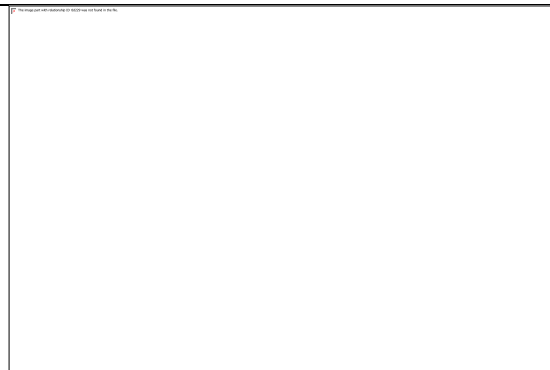


High school and junior college -1633

Bhayandar station



Divine Image English High School – 1594



Nageshwar Mahadev Shani Mandir – 1596



Mira BhayandarMunicipal school -1597

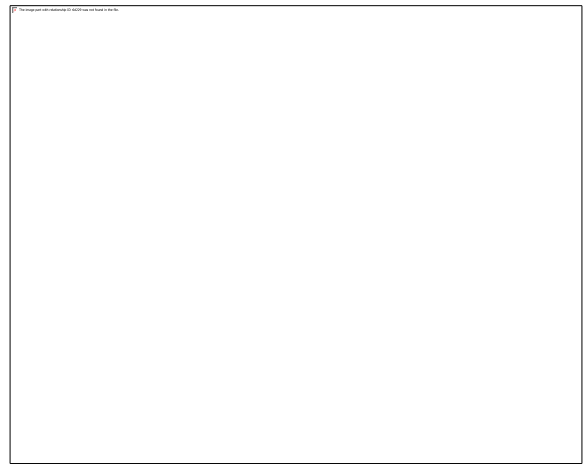


Kottakkal Arya Vaidya Sala- 1601

Chembur school



Dr B R Ambedkar School and College- 1618



Dr B R Ambedkar Primary School-1621



Mandir -1619



Dombivli station :



Sanjivani Surgical Hospital-1651



Dr Harne Hospital-1653



Nobal Hospital-1655



Play school -1654

GTB nagar station



Gurudwara-1085



GNV's Institute of Management - 1086

Kandivali station :



Mandir -591



Vighnaharta Hospital- 592



Ashirvad hospital -593



Asha Hospital-594



Sai Mandir-595

Kasara station :



Maruti Mandir- 30



Shri Siddheshwar Mandir-517



Mandir-654



Hanumanji Mandir -1660



Primary School-1661





Masjid -357

Shri Sheetala Devi Mandir-1659

Mira road station :



Tirupati Nursing Home-1607



Matoshree Hospital-1608

Mulund station :



Ganesh Mandir-188



Maruti Mandir-1112



Mukteshwar Mahadev Mandir-1639



IGNOU-1640



Mandir-1642

Nalla Soparastation :



Gogate Ganpati Mandir - 190



St Joseph And Marry Convent School - 657



Summer Field School -1446

Neral station



Sunanada school -1664

Santacruz station :



Maharshi Dadhichi Hospital - 21



R K Hospital – 490



Hari Masjid -1136



Al Masjid-ul Ezzi - Dawood Bohra Masjid-1615



Shri Shiv Sai Mandir-1578



Masjid -1585



Ravi hospital -1586

Annexure 4.5: E&S Profile of PIA

Sr. No.	Railway Station Name	Category	E & S Profile	UID
1.	Bhandup	Government Office/Infrastructure	Salt Department Govt office	1317
		School	KI Mehra UBS English Primary School	1497
		Religious Place	Mahadev Mandir	1630
		Post & Telecom Facility	Post Office	1632
		Education Facility	High School and Jr College	1633
		Transport Facility	Bhandup Railway Station	1636
		Religious Place	Krishna Mandir	1637
2.	Bhayandar	Transport Facility	Best/MBMT Bus Stop	90
		School	Municipality School	394
		Transport Facility	Rickshaw Stand	1116
		Transport Facility	Bus Stop	1256
		Religious Place	Shani Mandir	1260
		Religious Place	Jain Mandir	1311
		School	DominicSavio Vidyalaya	1438
		School	Divine Image English High School	1594
		Religious Place	Nageshwar Mahadev Shani Mandir	1596
		School	Mira Bhayndar Municipal School	1597
		Transport Facility	Bhayandar Railway Station	1598
		Police Station	Balaji Nagar Police Chowki (Bhayandar)	1599
		Transport Facility	Railway Booking Office	1600
Hospital/Health Centre	Kottakkal Arya Vaidya Sala	1601		
3.	Chembur	Transport Facility	Bus Stop	117
		College	Dr B R Ambedkar College	164
		School	Dr Babasaheb Ambedkar High School	165
		School	New Model English High School, Tally Academy	404
		Post & Telecom Facility	Post Office	888
		Hospital/Health Centre	ManjiriJuvekar Joshi Polyclinic	1124
		School	Station Chembur Urdu School	1331
		School	Samayak Deep Vidyalaya	1573
		Education Facility	Dr B R Ambedkar School and College	1618
		Religious Place	Mandir	1619

Sr. No.	Railway Station Name	Category	E & S Profile	UID
		Police Station	P L Lokhande Beat Chowki	1620
		School	Dr B R Ambedkar Primary School	1621
		Transport Facility	Chembur Railway Station	1622
		Police Station	Chembur Station Police Chowki	1623
4.	Dombivli	Transport Facility	Bus Stop	118
		School	Euro Kids Pre School	176
		Police Station	Police Station	537
		Education Facility	Kokane's Kohinoor Technical Institute	921
		Police Station	Police Station	1117
		Religious Place	Shree Ram Mandir	1118
		Transport Facility	Rickshaw Stand	1125
		School	Modern English Primary School	1539
		School	Mrs PremabenNangiGanjiHaria Gujrati School	1540
		Police Station	DombivliPolice Station	1649
		Religious Place	Mandir	1650
		Hospital/Health Centre	Sanjivani Surgical Hospital	1651
		Transport Facility	Dombivli Railway Station	1652
		Hospital/Health Centre	Dr Harne Hospital	1653
		School	Play School	1654
		Hospital/Health Centre	Nobal Hospital	1655
5.	Govandi	School	Municipal School	385
		Police Station	Police Station	436
		Religious Place	Shree Gavdevi Mandir	978
		School	Govandi Mun Hindi School	1572
		Police Station	Govandi Police Chowki	1624
		Transport Facility	Govandi Railway Station	1625
6.	GTB Nagar	Religious Place	Lord Ganesh Mandir	2
		Religious Place	Maa Durga Devi Mandir	8
		Religious Place	Mariamman Mandir	26
		Religious Place	Zion Christian Assembly - Church	600
		Religious Place	Gurudwara	1085
		Education Facility	GNVS Institute of Management	1086
		Transport Facility	GTB Nagar Railway Station	1087
7.	Kandivali	Hospital/Health Centre	Dalvi Hospital	148
		School	Vyas School	568
		Transport Facility	Kandivali Railway Station	590
		Religious Place	Mandir	591
		Hospital/Health Centre	Vighnaharta Hospital	592

Sr. No.	Railway Station Name	Category	E & S Profile	UID
		Centre		
		Hospital/health Centre	Aashirwad Hospital	593
		Hospital/health Centre	Asha Hospital	594
		Religious Place	Sai Mandir	595
		Post & Telecom Facility	Kandivali Sub Post Office	1609
8.	Kasara	Religious Place	Maruti Mandir	30
		Transport Facility	Kasara Bus Stop	274
		Transport Facility	Taxi Stand	286
		Religious Place	Shri Siddheshwar Mandir	517
		School	ZP School	601
		Religious Place	Mandir	654
		Transport Facility	Kasara Railway Station	1658
		Religious Place	Shri Sheetla Devi Mandir	1659
		Religious Place	Hanumanji Mandir	1660
		School	Primary School	1661
9.	Mankhurd	Religious Place	Masjid	357
		Police Station	Police Chowki	428
		Police Station	Police Chowki Mankhurd Railway Station	977
		School	Rock-He Memorial Primary School	1571
		Transport Facility	Mankhurd Railway Station	1626
		Police Station	LICMankhurd	1627
		Government Office/Infrastructure	Chief Executive Office	1628
		Police Station	Assistant Police Officer	1629
10.	Mira Road	Education Facility	Indian Mobile Institute & Research Centre	943
		Transport Facility	Auto Stand	1258
		Transport Facility	Rickshaw Stand	1259
		Transport Facility	Mira Road Railway Station	1605
		Police Station	Shantinagar Police Chowki	1606
		Hospital/Health Centre	Tirupati Nursing Home	1607
		Hospital/Health Centre	Matoshree Hospital	1608
11.	Mulund	Transport Facility	Bus Stop	124
		Hospital/Health Centre	Ganatra Hospital	184
		Religious Place	Ganesh Mandir	188
		School	Vidya Prabodhini English School	911
		Religious Place	Maruti Mandir	1112

Sr. No.	Railway Station Name	Category	E & S Profile	UID
		Transport Facility	Bus Stand	1119
		Religious Place	Shri Swaminarayan Mandir	1121
		Transport Facility	Mulund Railway Station	1638
		Religious Place	Mukteshwar Mahadev Mandir	1639
		University	IGNOU	1640
		Religious Place	Mandir	1642
		Government Office/Infrastructure	BMC Office	1643
		Police Station	Police Chowki	1644
12.	Mumbai Central	Police Station	Police Station	543
		Transport Facility	Prepaid Taxi	555
		Religious Place	Yasho Mandir	585
		Police Station	Office of Sub-Divisional Security Commissioner	620
		Police Station	Division Security Commissioner Railway Protection Force	652
		Government Office/Infrastructure	Railway Office	1575
		Police Station	Police Station Railway Protection	1576
13.	Nalla Sopara	Religious Place	Gogate Ganpati Mandir	190
		Transport Facility	Rikshaw Stand	449
		Government Office/Infrastructure	Talathi Office	656
		School	St Joseph And Marry Convent School	657
		Transport Facility	ST Stand and Depot	664
		Overhead Water Tanks	Water Tank	927
		School	Summer Field School	1446
		14.	Neral	Education Facility
Religious Place	Dawood Bohra Masjid			981
Transport Facility	Neral Railway Station			1662
Police Station	Rpf Police Chowki Neral			1663
School	Sunanda School			1664
15.	Santacruz	Hospital/Health Centre	Maharshi Dadhichi Hospital	21
		Police Station	Santacruz Police Chowki	53
		Government Office/Infrastructure	Western Railway Staff Quarters	54
		Transport Facility	Best Bus Station	88
		Religious place	Revival Ag Church & Ministries	444
		Hospital/Health Centre	R K Hospital	490
		Religious Place	Sunni Masjid	874

Sr. No.	Railway Station Name	Category	E & S Profile	UID
		Post & Telecom Facility	Post Office	967
		Religious Place	Hari Masjid	1136
		Transport Facility	Santacruz Railway Station	1612
		Transport Facility	Santacruz Bus Station	1613
		Post & Telecom Facility	Santacruz East Sub Post Office	1614
		Religious Place	Al Masjid-UI Ezzi - Dawood Bohra Masjid	1615
16.	Vasai Road	Religious Place	Al Noor Masjid	48
		Transport Facility	Bus Station	108
		Transport Facility	Bus Stop	130
		Transport Facility	Rickshaw Stand	447
		School	Rajiv Gandhi Hindi School	566
		Transport facility	Vasai Road Railway Station	659
		Police Station	Railway Suraksha Bal	660
		Post & Telecom Facility	Vasai Road East Sub Post Office	661
		Government Office/Infrastructure	Office of The Inspector of Salt	662
		Education Facility	NIIT	932
		Transport Facility	Bus Stop	933
		School	Zpurdu School Shanti Nagar	1105
		Education Facility	Lall Institute	1106
		School	Abhinav Primary School	1443
		School	Alnoor Primary English School	1444
		Religious Place	Shri Shiv Sai Mandir	1578
		Government Office/Infrastructure	MSEDCL Vasai Division Office	1581
		Electricity facility	Power Grid	1582
		Government Office/Infrastructure	Vasai Virar BMC Manikpur	1584
		Religious Place	Masjid	1585
Hospital/Health Centre	Ravi Hospital	1586		
17.	Ghatkopar	Transport Facility	Bus Stop	109
		Hospital/Health Centre	Hindu Sabha Hospital	237
		School	Trushnall's School	305
		School	MCGM School	364
		Hospital/Health Centre	Parakh Hospital	422
		College	Ramniranjan Jhunjunwala College & Hindi High School	439

Sr. No.	Railway Station Name	Category	E & S Profile	UID
		Post & Telecom Facility	Post Office	551
		Hospital/Health Centre	Sohum Health Care Centre	1341
		School	Shree Krishna Foundations Lakshya Prep High School & Jr College	1487

Source: RITES Field Studies December 2020

UID: Unique Identification Number

Annexure 9.1: Photographs of Consultations



Bhandup Station



Nerul Station



Mankhurd Station



Kandivali Station



GTB Nagar Station



Chembur Station



Govandi Station



Mulund Station



Mumbai Central Station



Nalla Sopara Station



Vasai Road Station

Annexure 9.2: Minutes of Public Consultation

Public Consultation

Date: 20/12/20 Place: Kandivali^P

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>			
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in Income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in Income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Resi		
1.	Relocation	When we are rehabilitated we should have our houses & shops at a distance of 1km so that our livelihood Problems will be solved.	
2.	Livelihood	The question of livelihood will arise on a large scale when our homes and shops are rehabilitated.	
3.	compensation	We should get a house for & Allowances house and shop for shop.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Access to facilities	Where you are going to give us houses, shops, there should be necessities of life & communication facilities.	
5.	Decision Making	We make all the decision in our house together.	
6.	Safety during Travel	There should be no potholes on the road. The nala should be in order. The transport of bus service should be in order.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Jignesh shah	M	49	Job	
2.	Alaka Bhanut shah	F	55	Job	
3.	Anil Gokhaldas shah	M	40	Job	
4.	Jigna Ajay malhan	F	54	Job	
5.	Jyoti Kuntikumhar shah	F	75	Job	
6.	Nitin Rastilal shah	M	55	Job	
7.	Kinut Abhaychandra shah	M	64	Job	
8.	pamchal Vansh Beh	M	60	Job	
9.	Shantilal Vasanti shah	M	72	Job	
10.	Jayesh Shah	M	65	Job	
11.	Smita Arunkumar shah	F	55	Job	
12.	Yogesh M. malhan	M	57	Job	
13.	Suresh Govindas shah	M	62	Job	
14.	Rupa M. malhan	F	40	Job	
15.	Vinodchandra Hiralal shah	M	48.	Business	

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION

Date: 25/12/2020 Station Name: Kandivally
(Auto-Rikshaw-Drivers)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgrade your respective station?	<input checked="" type="checkbox"/>			
2.	What will be the environment impact, due to proposed development activity? Specifically on Air, Water, Soil, and Ecology?				
3.	Due to proposed development activity, the frequency of trains will increase on central, harbour and western line; what will be the impact?	<input checked="" type="checkbox"/>			
4.	What is your opinion about noise and vibration on existing railway system and due to proposed development activity?	<input checked="" type="checkbox"/>			
5.	The skywalk, footpath and parking are proposed by Railway under proposed development activity? Is that essentially required?	<input checked="" type="checkbox"/>			
6.	What are the grievances about (Land, Shop, Trees, Livelihood), due to proposed development activity and what is your opinion for the Grievance Redressal Mechanism?				
7.	What impacts, both positive and negative of the project do you foresee?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1.	Increase in income	<input checked="" type="checkbox"/>	1.	Loss of livelihood	
2.	Reduce headway due to CBTC	<input checked="" type="checkbox"/>	2.	Passenger load at stations due to CBTC	<input checked="" type="checkbox"/> <i>Lead with shift - No</i>
3.	Mitigation of Noise & Vibration	<input checked="" type="checkbox"/>	3.	Impact on Noise & Vibration	<input checked="" type="checkbox"/> <i>- some impact</i>
4.	Decrease the air pollution load	<input checked="" type="checkbox"/> <i>No pollution</i>	4.	Impact on trees	<input checked="" type="checkbox"/> <i>- Yes</i>
5.	Better and fast connectivity	<input checked="" type="checkbox"/>	5.	Chances of accidents	<input checked="" type="checkbox"/> <i>may be</i>
6.	Increase in Customers	<input checked="" type="checkbox"/>	6.	Loss in income	<input checked="" type="checkbox"/> <i>- (during construction phase)</i>
7.	Increase accessibility to facilities	<input checked="" type="checkbox"/>	7.	Structural loss	<input checked="" type="checkbox"/>
8.	Decrease in accidents	<input checked="" type="checkbox"/>	8.	Loss of customers and supplies	<input checked="" type="checkbox"/>
9.	Increase in employment	<input checked="" type="checkbox"/>	9.	Disruption of social/cultural/economic harmony	
10.	Decrease in migration	<input checked="" type="checkbox"/>	10.	Religious/sites and networks	<input checked="" type="checkbox"/>

11.	Increase in property value	✓	11.	Decrease in value of properties	x
12.	Industrial Development and Networking	✓	12.	Increase in accidents	maybe
13.	Improvement in transportation system	✓	13.	Increase in crime rates	—
14.	Increase in Education level	✓	14.	Increase in Migration	✓
15.	Station specific DMP (Disaster Management Plan)	Not Reqd	15.	Existing safety of Indian railway	— goes
16.	Others Specify		16.	Others Specify	

ISSUES IDENTIFIED AND DISCUSSED IN PUBLIC CONSULTATIONS:

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
1.	Environmental pollution	The proposed activities like footpath Deck are not creating pollution, because heavy machinery not used.	
2.	Trees —	Trees save.	
3.	Noise and vibration	Noise when Train come and Recieve from platform	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
	CBTC -	Very good. because If will give more customers to them	
4.	Overall developm -	very happy ; complete family dependent on Auto-Ricksha business If they will get more customers, income will be more	
5.	Transport -	- If will add - good technologies at station. - due to CBTC transportation will be improved and provide good aesthetics to the railway station	
6.			

S. No	Issues raised/Discussed	Participant Suggestions/ comments	R
		100 - motorcycle parking	

DETAILS OF PARTICIPANTS:-

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Mohammad Farook Farooq	M		- S.M.	[Signature]
2.	Harendra	M	48		[Signature]
3.	Ketirwal Yadav	M	60		[Signature]
4.	Naresh Kopane	M	48		[Signature]
5.	Santlal Yadav	M	45		[Signature]
6.	Ompakash Yadav	M	35		[Signature]
7.	Jasadish Mishra	M	52		[Signature]
8.	Rajiv	M	46		[Signature]
9.	Krushna Pandey	M	39		[Signature]
10.	Ramesh Yadav	M	48		[Signature]
11.	Jayant Shing	M	60		[Signature]
12.	Siddinath	M	42		[Signature]
12.	Vinod Shah	M	30		[Signature]
14.	pojinee	M	25		[Signature]
15.					
16.					
17.					
18.					

Auto

parking

Date: 13/12/20 Public Consultation Place: Chembur (E)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
1.	Commercial		
1.	Relocation	we need shop in same area after rehabilitation and better management for houses.	
2.	Livelihood	our family situation will get worse after the house and shops are gone.	
3.	Compensation & Allowances	we should get a better house and shops.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	We all make family decision together.	
5.	Access to facilities	There should be all the necessities of life and communication facilities	
6.	Safety during travel	Traveling vehicles should be in good condition & Roads should be in order	
7.	Employment generation		

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Ansani	M	27	Business	.
2.	sabbir Unwala	M	70	Business	
3.	B. selraj	M	80	Business	
4.	Aasha Mahone.	F	40	Business	
5.	Prakash Mahone	M	60	Business	
6.	satish M. lokhade.	M	30	Business	
7.	Karan T. Sharma	M	35	Business	
8.	Premkumar Dube.	M	40	Business	
9.	Vaibhav R. Kumbale	M	50	Business	
10.	Suvarna B. Tarathe	F	45	Business	

Public Consultation

Date: 13/12/20 Place: Chembur

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2. What impacts, both positive and negative of the project do you foresee?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Special facilities for women	We request there should be security guards at station.	
9.	Regular info. on project	We got all the information about this project from surveyours.	
10.	women safety during travel	24 Hrs security and CCTV for women.	

Public Consultation

Date: 15/12/18

Place: Nalasopara - W

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	Yes			
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Commercial		
1)	Relocation	We need shop in same area after rehabilitation.	
2)	livelihood	our family situation will get worse after the shop is gone.	
3)	Compensation & Allowances	we should get a better house and shops for our house and shops.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	We all make my family decision together.	
5.	Access to facilities	There should be all the necessities of life and communication facilities.	
6.	safety during Travel.	Travel vehicles should be in good condition and roads should be in order.	
7.	Employment generation	our occupation & jobs are near from rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1	Nizam Vohara	M	54	Business	
2	Shinkhandar Vohara	M	38	Business	
3	Harun Vohara	M	40	Business	
4	Mohsin Vohara	M	30	Business	
5	Memshankar M. Goud	M	50	Business	
6	Dhananjay Rout	M	50	Business	
7.	Jalaji Gupta	M	50	Business	
8.	Yotish Rajendra Singh	M	45	Business	
9.	Abdul H. Soudagar	M	30	Business	
10.	Abdulla Soudagar	M	55	Business	
11	Shekhar Gupta	m	45	Business	
12.	Prathamsh sunve.	M	25	Business	
13.	Munir shauikh.	M	41	Business	
14.	Santosh Mishra	M	42	Business	
15	Rashan S. Amin	M	65	Business	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
10.	Women safety during travel	security guards should be set up for emergency of women at every station.	
11.	Health & Education facilities for children plan.	we should have a good hospitals and fast bus services in area where you will be staying.	
(11)	facilities for children		

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
16	Ashok Jaymaldas lae	m	65	Business	
17	shantilal Ramji cheda	m	44	Business	
18	Jayakan shetty	m	72	Business	
19	Ravindra Champalal Ranka	m	46	Business	
20	Dhiran Cheda	m	36	Business	
21	Rajkumar yadav	m	39	Business	
22	Deepak Mishra	m	37	Business	
23	Shashikant J. Naik	m	58	Business	
24	Santosh Ganpat Chougale	m	35	Business	
25	Ashok Sambhajikasikan	m	70	Business	
26	Smtati Vinayak Poipkar	m	58	Business	
27	Raju Tapman Bhagare	m	30	Business	
28	Ratnakar Shetty	m	70	Job	
29	Ravi Shah	m	40	Business	
30	panesh Mishra	m	45	Business	

Public Consultation

Date: 15/12/20

Place: Phanshap (E)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	1			
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	1
2	Increase in Customers		2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment		5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify	1	11	Others Specify	1

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Resi + Comm.		
1.	Relocation	When we are rehabilitated we should have our houses & shops at a distance of 1 km so that our livelihood problems will be solved.	
2.	livelihood	The question of livelihood will arise on a large scale when our homes and shops are rehabilitated.	
3.	Compensation	We should get a house for & Allowances house and shop for shop.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	We make all the decision in our house together.	
5.	Access to facilities:-	There should be all the necessities of life and communication facilities.	
6.	safety during travel	There should be no potholes on the road, The nala should be in order, The transport of bus service should in order	
7)	Employment generation	our employment, occupations and jobs should be kept at a minimum distance from rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Vinod Anand shetty	M	47	Business	..
2.	Geeta Vinod shetty	F	44	Job	
3.	Deepa Vinod shetty	F	24	Job	
4.	shashikala Raybhar	F	28	Job	shashikala
5.	Rsunay Raybhar	M	16	Job	Sunay
6.	Anil R. Raybhar	M	34	Job	Anil
7.	Anil H. Raybhar	M	26	Job	अनिल र. र. र.
8.	Ghuniya Raybhar	F	48	Job	गुनीया
9.	Munni Raybhar	F	35	Job	Munni
10.	Manju Raybhar	F	30	Job	Manju
11.	Sdayam Narayan Raybhar	M	28	Job	सदायम
12.	Rajendra panduravney Chalke	M	45	Business	र. च. च.
13.	Shankar Chalke	M	48	Business	
14.	Krishna Mahayan puyani	M	54	Business	

Public Consultation

Date: _____ Place: Bhandup (E)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Resit+Comm. special facilities women	keep 24 Hours securities for ladies, Add two compartment for ladies in train.	
9.	Regular Information on project	We have been given all the information about the upcoming Project.	
10.	Women safety during Travel	security guards should be set up at every station for women.	

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION

 Date: 22/12/2020

 Station Name: Bhardup

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgrade your respective station?	✓			
2.	What will be the environment impact, due to proposed development activity? Specifically on Air, Water, Soil, and Ecology? <i>yes</i>				
3.	Due to proposed development activity, the frequency of trains will increase on central, harbour and western line; what will be the impact? <i>✓</i>				
4.	What is your opinion about noise and vibration on existing railway system and due to proposed development activity? <i>✓</i>				
5.	The skywalk, footpath and parking are proposed by Railway under proposed development activity? Is that essentially required? <i>yes</i>				
6.	What are the grievances about (Land, Shop, Trees, Livelihood), due to proposed development activity and what is your opinion for the Grievance Redressal Mechanism?				
7.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1.	Increase in income	✓	1.	Loss of livelihood	✓
2.	Reduce headway due to CBTC	✓	2.	Passenger load at stations due to CBTC	✓
3.	Mitigation of Noise & Vibration	✓	3.	Impact on Noise & Vibration	✓
4.	Decrease the air pollution load	✓	4.	Impact on trees <i>may be</i>	✓
5.	Better and fast connectivity	✓	5.	Chances of accidents	✓
6.	Increase in Customers	✓	6.	Loss in income	✓
7.	Increase accessibility to facilities <i>not clear</i>	✓	7.	Structural loss	✓
8.	Decrease in accidents	✓	8.	Loss of customers and supplies	✓
9.	Increase in employment		9.	Disruption of social/cultural/economic harmony	✗
10.	Decrease in migration	✗	10.	Religious/sites and networks	✗


11.	Increase in property value	✓	11.	Decrease in value of properties	No
12.	Industrial Development and Networking		12.	Increase in accidents	No
13.	Improvement in transportation system	✓	13.	Increase in crime rates	my bc
14.	Increase in Education level	✓	14.	Increase in Migration	
15.	Station specific DMP (Disaster Management Plan)	Not done	15.	Existing safety of Indian railway	✓
16.	Others Specify	✓	16.	Others Specify	✓

ISSUES IDENTIFIED AND DISCUSSED IN PUBLIC CONSULTATIONS:

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
1.	Land →	The land is Sultpan Land	
2.	Noise and vibration	respondents replied that they are staying around the station From many years No impact on Noise and vibration	
3.	-	-	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
3	Trees —	Respondents replied that, trees are absorbent for Environment pollution. therefore, instead of cutting the trees. trees are replanted	
4.	Auto drivers →	The Auto drivers welcome the project any new facilities to railway gives more customers to auto drivers. and improve their financial Condition	
5.	Trees →	Save more trees as possible	
6.	PHC —	Primary health centre is very fair. If possible railway provide any PHC, near the railway gate.	

DETAILS OF PARTICIPANTS:-

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Mohammad Sheikh	M	33	Solon	
2.	Sheshikala Rajbhar	F	28	Housewife	
3.	Gita Vinod Shetty	F	44	Housewife	
4.	Vinod Anand Shetty	M	47	Hotel	
5.	Chanda Rajbhar	F	16	Student	Chanda
6.	Dipa Vinod Shetty	F	23	Service	
7.	Sanjay Tiwari	M	48	Watchman	
8.	Anil Rajbhar	M	28	Labour	
9.	Rajjesh Ali Sheikh	M	28	Driver	
10.	Bhendup Riksha Stand, Federation				
11.					
12.	Mahendra Tukkar	M	43	Auto Driver	Tukkar
13.	Rajendra Chalake	M	45	Auto Driver	Chalake
14.	Vijay Khairnar	M	45	Auto Driver	Khairnar
15.	Bharati Goraswa	F	45		
16.	Shekhar Pawar	M	46		Pawar
17.					
18.					

affected PAP

Auto Drivers

Public Consultation

Date: 16/11/20 Place: Mira Road

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>			
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in Income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
1.	Relocation	House and shops should be in place after re-habilitation.	
2.	Livelihood	It is doubtful whether they will get another houses after houses are gone.	
3.	Compensation & Allowances	This is a request for us to get houses in exchange for a house.	

Public Consultation

Date: 16/12/20

Place: Mira Road

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Special facility for women in train	Keep 24 Hours CCTV & securities for ladies.	
9.	Regular information on project	we have been given all the information about the upcoming project	
10.	women safety during Travel	Security guards should be setup for emergency of women at every station.	

Public Consultation

Date: 16/12/20

Place: Mulund (W)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	✓			
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	✓	1	Loss of livelihood	✓
2	Increase in Customers		2	Loss in income	✓
3	Increase accessibility to facilities	✓	3	Structural loss	✓
4	Decrease in accidents	✓	4	Loss of customers and supplies	✓
5	Increase in employment		5	Disruption of social/cultural/economic	✓
6	Decrease in migration	✓	6	Religious/sites and networks	✓
7	Increase in property value	✓	7	Decrease in value of properties	✓
8	Industrial Development and Networking	✓	8	Increase in accidents	✓
9	Improvement in transportation system	✓	9	Increase in crime rates	✓
10	Increase in Education level	✓	10	Increase in Migration	✓
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Comm.		
1.	Relocation	we should get our shops at a distance of 1 km from the railway office at the time of rehabilitation.	
2.	livelihood	when our shop is gone, our financial and wealth situation will end/stop. It is very critical situation for us.	
3.	Compensation & Allowances	we should get a house for house & shops for shop.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	we make all the decision in our house together	
5	Access to Facilities	we should have all kinds of services available.	
6.	safety during travel	Transport of buses & rickshaws services should in order.	
7.	Employment generation	our jobs & business are better after rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Manoj Gupta	M	35	Business	
2.	shubhash chandran Gupta	M	55	Business	
3.	pravin Gupta	M	33	Business	
4.	chitta sanku Gupta	M	45	Business	
5.	shobantul Jainwalal	M	55	Business	
6.	Manish Jothniya	M	40	Business	
7.	Jakira lokhandwala	F	76	business	
8.	Natawanlal H. Gool	M	61	Business	
9.	prashant Katar	M	47	Business	
10.	Ashok D. Rajpal	M	58	Business	
11.	Hishi Rajesh malik	M	30	Business	
12.	Kirit Momaya	M	39	Business	
13.	Nilesh shah	M	52	Business	
14.	Ninal Asakar	M	40	Business	
15.	knitkumar R. sangavi	M	45	Business	

Date: 16/12/20

Public Consultation

Place: Malund

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Comm special facilities women	keep 24 hrs securities for ladies, Add extra two compartment for ladies in train.	
9.	Regular Info on project	we have been given all the information about the upcoming Project.	
10.	women safety during travel	security guard should be set up at stations.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
11.	Health & Education Facility for children	Colleges, school and hospitals should have quality rating and near by our houses	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
16.	Dasaraju Mahadev Kulkarni	M	51	Business	
17.	Ahmad Kantibek chedha	M	35	Business	
18.	Jayantilal R. Kanojiya	M	36	Business	
19.	Prabhudhas P. Shah.	M	40	Business	
20.	Parash S. Shah	M.	45.	Business	

Public Consultation

Date: 17/12/2020

Place: Govandi (E)

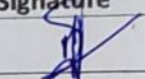
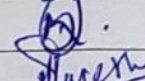
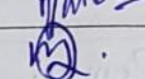
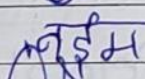
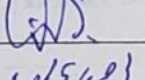
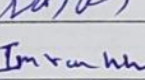
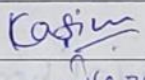
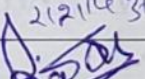
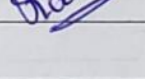
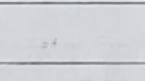
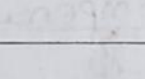
Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in Income	<input type="checkbox"/>	1	Loss of livelihood	<input type="checkbox"/>
2	Increase in Customers	<input type="checkbox"/>	2	Loss in Income	<input type="checkbox"/>
3	Increase accessibility to facilities	<input type="checkbox"/>	3	Structural loss	<input type="checkbox"/>
4	Decrease in accidents	<input type="checkbox"/>	4	Loss of customers and supplies	<input type="checkbox"/>
5	Increase in employment	<input type="checkbox"/>	5	Disruption of social/cultural/economic	<input type="checkbox"/>
6	Decrease in migration	<input type="checkbox"/>	6	Religious/sites and networks	<input type="checkbox"/>
7	Increase in property value	<input type="checkbox"/>	7	Decrease in value of properties	<input type="checkbox"/>
8	Industrial Development and Networking	<input type="checkbox"/>	8	Increase in accidents	<input type="checkbox"/>
9	Improvement in transportation system	<input type="checkbox"/>	9	Increase in crime rates	<input type="checkbox"/>
10	Increase in Education level	<input type="checkbox"/>	10	Increase in Migration	<input type="checkbox"/>
11	Others Specify	<input type="checkbox"/>	11	Others Specify	<input type="checkbox"/>

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
1.	Comm.		
1.	Relocation	we should get our shops at a distance of 1 km from the railway office at the time of rehabilitation.	
2.	Livelihood	when our shop is gone, our financial situation will end and we will have a subsistence band	
3.	Compensation & Allowances	We should get a house for house & shops for shop.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	we make all the decision in our house together	
5.	Access to Facility	we should have all kinds of services & facilities available.	
6.	safety during Travel	Transport of buses & rickshaws services should in order.	
7.	Employment generation	our jobs & business are better after rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Haji Mohamad Farooq Qureshi	M	52	Business	
2.	Mumtaz Qureshi	F	46	Business	
3.	Mohammad Faiyaz Qureshi	M.	52	Business	
4.	Mumtaz M.F. Qureshi	F	46	Business	
5.	Naima Qayyum Qureshi	F	50	Business	
6.	Saleem Akkshintak	M	54	Business	
7.	Sanaullah Shaikh	M.	30	Business	
8.	Vimaladevi Rajaram Khanolkar	F	50	Business	
9.	Ansari Kasim ali Rashid ali	M	36	Business	
10.	Ansari Rashid ali	M	59	Business	
11.	Rajy Rajaram Khanolkar	M	44	Business	
12.	Javed Qureshi	M	32	Business	
13.	Nazir Shaikh Farid	M	40	Business	
14.	Mugeem Khan	M	35	Business	
15.	Ashok R. Hegde	M	35	Business	

Public Consultation

Date: 17/12/20

Place: Govandi

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Comm.		
8.	special facilities women	Keep 24 Hours securities for ladies, Add two compartment for ladies in train.	
9.	Regular Information on project	We have been given all the information about the upcoming project.	
10.	women safety during travel	security guards should be setup at stations.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
11.	Health & Education Facility for children	colleges, schools and hospitals should have quality ratings and nearby our houses.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
16.	Khan Abdul Qamar	M	40	Business	
17.	Shripad R. Tandalekar	M	35	Business	
18.	Bashir Khan	M	35	Business	
19.	Sabbir Qureshi	M	37	Business	
20.	Mosin Khan	M	23	business	
21.	Faizim Shaikh	M	27	Business	

Public Consultation

Date: 17/12/2020

Place: G.T.B. Nagar (W)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Residential/ Commercial		
1.	Relocation	when we are rehabilitated we should have our houses at distance of 500m so that our problem are solved.	
2.	Livelihood	The question of livelihood will arise on large scale when our homes are rehabilitated.	
3.	Compensation & Allowances	we should get a better house and shops for our house and shops.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4	Decision making	we all make decision together about all things.	
5	Access to Facilities	There should be all the communication facilities	
6	Safety during Travel	The nala should be in order and road are proper.	
7	Employment generation	Our employment and jobs should be kept at minimum distance from rehabilitation area	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Pushpa Balu punswami	F	55	Job	
2.	Rekha surendra Dighe	F	46	Job	
3.	Dimple phutabh Dighe	F	35	Job	Dimple
4.	Shabana Akbar shaikh	F	47	Job	Shabana
5.	Komal Jitendra Chavriya	F	40	Job	Komal
6.	Priti mahigandha	F	22	Job	Priti
7.	Savitri Naradeo Gandale	F	77	Job	
8.	Kamruj Khan	M	33	Job	Kamruj
9.	Ramesh Kamlesh Gupta	M	31	Job	Ramesh
10.	Nandkishor Kanojiya	M	47	Job	Nandkishor
11.	Babul paswan	M	27	Job	Babul
12.	Poolesari Varma	M	28	Job	Poolesari
13.	Shivkumar G. Gupta	M	47	Job	Shivkumar
14.	Shivaji Maskar	M	40	Job	
15.	Mal Rafik Mansoor	M	58	Job	

Public Consultation

Date: 17/12/20

Place: G.T.B Nagar

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Resi/comm.		
8.	special facilities women	keep 24 Hours securities for ladies, Add two compartment for ladies in train.	
9.	Regular Info. on Project	we have been given all ideas and information about upcoming Project	
10.	women safety during travel	security guards should be set up at stations for womens.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	11	In the areas where you are giving us houses should be close to the colleges as it will fill the gap of education of our children.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
16	Rajee	M	50	Business	
17	Suraj mishra	M	50	Business	
18	Sudha	F	55	Business	
19	Dharmendra Rajbhar	M	37	Business	
20	Anil mishra	M	32	Job	
21	Subhash Rajbhar	M	29	Job	
22	Ushat chormare	M	22	Job	
23	Siddesh patil	M	20	Job	
24	Saleem Khan	M	25	Job	

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION

Date: 26/12/2020

Station Name: GTB Nagar

Sr. No	Perception about the Project	Yes	No	Remarks
1.	Do you think it is necessary to upgrade your respective station?	✓		
2.	What will be the environment impact, due to proposed development activity? Specifically on Air, Water, Soil, and Ecology? ✓			
3.	Due to proposed development activity, the frequency of trains will increase on central, harbour and western line; what will be the impact? ✓			
4.	What is your opinion about noise and vibration on existing railway system and due to proposed development activity? ✓			
5.	The skywalk, footpath and parking are proposed by Railway under proposed development activity? Is that essentially required? ✓			
6.	What are the grievances about (Land, Shop, Trees, Livelihood), due to proposed development activity and what is your opinion for the Grievance Redressal Mechanism? ✓			
7.	What impacts, both positive and negative of the project do you foreseen? ✓			

S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1.	Increase in income	✓	1.	Loss of livelihood - by slum people	
2.	Reduce headway due to CBTC	✓	2.	Passenger load at stations due to CBTC ✓ reduces	
3.	Mitigation of Noise & Vibration (Not much)	✓	3.	Impact on Noise & Vibration - Not much	
4.	Decrease the air pollution load	✓	4.	Impact on trees → shrubs and	
5.	Better and fast connectivity	yes ✓	5.	Chances of accidents → maybe	
6.	Increase in Customers	✓	6.	Loss in income → slum people	
7.	Increase accessibility to facilities	✓	7.	Structural loss → yes	
8.	Decrease in accidents	✓	8.	Loss of customers and supplies → yes	
9.	Increase in employment	✓	9.	Disruption of social/cultural/economic harmony ✓	yes
10.	Decrease in migration	✓	10.	Religious/sites and networks - yes temple	

11.	Increase in property value	✓	11.	Decrease in value of properties	No
12.	Industrial Development and Networking	✓	12.	Increase in accidents	No
13.	Improvement in transportation system	✓ yes	13.	Increase in crime rates	No
14.	Increase in Education level	✓ yes	14.	Increase in Migration	No
15.	Station specific DMP (Disaster Management Plan)	Not reqd	15.	Existing safety of Indian railway	Yes
16.	Others Specify	✓	16.	Others Specify	✓



ISSUES IDENTIFIED AND DISCUSSED IN PUBLIC CONSULTATIONS:

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
1.	Trees →	many persons told that predominant trees are Kadam, and jungali shrubs. these shrubs must be displaced or transplanted. Trees must save	
2.	Noise and vibration →	The slum people told that they are acclimated to different area. Noise is not problem for them.	
3.	Toilets	toilets were present at platform of and of Divyang toilet also present	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
	CCTV →	The GIB Nagar station is under the surveillance of CCTV cameras.	
4.	Connectivity →	Both East and West Side is well connects with Best Bus stands and Auto stands. It will provide end point connectivity to the commuters.	
5.	Drinking water →	Drinking water facility is provided ^{proper} at platform.	
	Wheelchair →	wheelchair is available with station manager office	
6.			

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Rem
	pratiksh Neng Masa celan		

DETAILS OF PARTICIPANTS:-

S. No	Name of Participants	Sex	Age	Occupation	Signature	M
1.	M. A. H. patkar	M	54	Comm S.m.		
2.	Suhel Raje	m		GBS	Suhel	
3.	Babuli	F	45			
4.	Pushpa	F	60			
5.	Monya	F	22		Mari	
6.	Nandkishor	M	46			
7.	Rekha digan	F	48			
8.	Kela chavadiya	F	65			
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						

Public Consultation

Date: 17/12/2020

Place: Mankhurd

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment		5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Comm.		
1.	Relocation	House and shops should be in place after rehabilitation.	
2.	livelihood	It is doubtful whether they will get another houses & shops after rehabilitation.	
3.	Compensation & Allowances	This is request for us to get houses in exchange for house.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	we make all the decision in our house together	
5.	Access to facilities	There needs to ^{Communication} facility where rehabilitation is to be provided.	
6.	safety during Travel	Roads, gutter, travels facilities should be in good condition at the place of rehabilitation.	
7.	Employment generation	Request to be close to employment and job after rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Rukmini prakash Ghorpade	F	55	Business	Rukmini Ghorpade
2.	Pratibha Balkrushna Mohite	F	50	Business	Pratibha Mohite
3.	Anil Rajaram salunkhe	M	56	Business	Anil Salunkhe
4.	Vandana Anil salunkhe	F	45	Business	V. A. Salunkhe
5.	Jaxmi sherman Biradar	F	70	Business	Jaxmi Biradar
6.	Samiksha Bhagawan Mhatre	F	30	Business	Samiksha Mhatre
7.	Raju Ansanali Keshaike	M	30	Business	Raju Ansanali
8.	Tulasabai Balu sangavi	F	55	Business	Tulasabai Sangavi
9.	santosh B. sansalavi	M	30	Business	Santosh Sansalavi
10.	Nandakal Kulkarni patthe	M	53	Business	Nandakal Patthe
11.	Goutam Shankar ghodage	M	60	Business	Goutam Ghodage
12.	Indu Ramchandra yadavankar	F	60	Business	Indu Yadavankar
13.	Gouri Jayantant bhise	F	28	Business	Gouri Bhise
14.	Pushpa Hirabai solanki	F	30	Business	Pushpa Solanki
15.	Hirabai Velsi Vaghi	F	70	Business	Hirabai Vaghi

Public Consultation

Date: 17/12/20

Place: Mankhurd

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase In Income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in Income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8	Special facilities women	keep 24 Hrs CCTV for ladies.	
9	Regular info: on project	we have been given all the information about the upcoming Project.	
10	women safety during Travel	Security guards should be set up for emergency of women at every stations.	

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION

Date: 24/12/2020

Station Name: Mankhurd

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgrade your respective station?	<input checked="" type="checkbox"/>			
2.	What will be the environment impact, due to proposed development activity? Specifically on Air, Water, Soil, and Ecology? <input checked="" type="checkbox"/>				
3.	Due to proposed development activity, the frequency of trains will increase on central, harbour and western line; what will be the impact? <input checked="" type="checkbox"/>				
4.	What is your opinion about noise and vibration on existing railway system and due to proposed development activity? <input checked="" type="checkbox"/>				
5.	The skywalk, footpath and parking are proposed by Railway under proposed development activity? Is that essentially required? <input checked="" type="checkbox"/>				
6.	What are the grievances about (Land, Shop, Trees, Livelihood), due to proposed development activity and what is your opinion for the Grievance Redressal Mechanism? <input checked="" type="checkbox"/>				
7.	What impacts, both positive and negative of the project do you foresee?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1.	Increase in income	<input checked="" type="checkbox"/>	1.	Loss of livelihood	<input checked="" type="checkbox"/>
2.	Reduce headway due to CBTC	<input checked="" type="checkbox"/>	2.	Passenger load at stations due to CBTC	<input checked="" type="checkbox"/>
3.	Mitigation of Noise & Vibration	<input checked="" type="checkbox"/>	3.	Impact on Noise & Vibration	
4.	Decrease the air pollution load	<input checked="" type="checkbox"/>	4.	Impact on trees <i>-very less trees</i>	
5.	Better and fast connectivity	<input checked="" type="checkbox"/>	5.	Chances of accidents	<input checked="" type="checkbox"/>
6.	Increase in Customers	<input checked="" type="checkbox"/>	6.	Loss in income	<input checked="" type="checkbox"/>
7.	Increase accessibility to facilities	<input checked="" type="checkbox"/>	7.	Structural loss	<input checked="" type="checkbox"/>
8.	Decrease in accidents	<input checked="" type="checkbox"/>	8.	Loss of customers and supplies	<input checked="" type="checkbox"/>
9.	Increase in employment	<input checked="" type="checkbox"/>	9.	Disruption of social/cultural/economic harmony <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10.	Decrease in migration <i>Not known</i>		10.	Religious/sites and networks	<input checked="" type="checkbox"/>

11.	Increase in property value	✓	11.	Decrease in value of properties	
12.	Industrial Development and Networking	✓	12.	Increase in accidents	✓
13.	Improvement in transportation system	✓	13.	Increase in crime rates	✓
14.	Increase in Education level	✓	14.	Increase in Migration	
15.	Station specific DMP (Disaster Management Plan)	Not required	15.	Existing safety of Indian railway	✓
16.	Others Specify		16.	Others Specify	✓

ISSUES IDENTIFIED AND DISCUSSED IN PUBLIC CONSULTATIONS:

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
1.	Trees →	Affected trees should not cut. Trees must be transplanted	
2.	Noise and vibration	The vegetable vendors are not feeling any adverse impact due to current noise and vibration.	
3.	Pollution due to Construction activity	yes pollution will come due to proper develop ment activity during construction and operation but impact is not significant	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
	plastic pollution →	The Mankhurd Station is NO plastic zone - Many advertise signboards & cables sides of stations are across customers by Railway staff	
4.	Solid waste	- BMC dust bins are in rail premises in west side.	
	CBTC →	very good project they want the project	
5.	Rodents →	Rodents are present along the track and cut the signalling wires.	
6.			

Public Consultation

Date: 18/12/20

Place: Neral (vi)

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Resit Comm		
①	Relocation	We need our shops and houses within 1 km after the shops and houses are going.	
②	Livelihood	our monthly amount will be closed after our houses and shops are gone and we will not have a house to stay after house are gone.	
③	Compensation & allowances	We should get a house for house and shop for a shop.	

(2)

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
④	Decision making at household live :-	We make all the decision in our house together.	
⑤	Access to facilities :-	There should be all the necessities of life and communication facilities.	
⑥	safety during travel		
⑦	Employment generation		

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	Gajendra Waseswale	M	60	Job	
2.	Manohar Chougale	M	30	Job	
3.	Munib chand husain shankh	M	72	Job	
4.	Naishali Arvind patil	F	65		
5.	Sumit Parab	M	25	Job	
6.	Rohit Kadam	M	55	Job	
7.	Sanket Patil	M	45	Job	
8.	Sangita shinde	F	32	Job	

Public Consultation

Date: 18/12/20 Place: Neral

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>			
2. What impacts, both positive and negative of the project do you foreseen?					
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in Income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in Income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues 3

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Special facilities for women in train	keep 24 Hours CCTV & security for ladies and Add two compartment for ladies in train.	
9.	Regular information on project.	we have been given all the information about about the upcoming project	
10.	Women safety during travel		

ENVIRONMENT & SOCIAL PUBLIC CONSULTATION

Date: 23/12/2020

Station Name: Neral

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgrade your respective station?	✓			
2.	What will be the environment impact, due to proposed development activity? Specifically on Air, Water, Soil, and Ecology? ✓				
3.	Due to proposed development activity, the frequency of trains will increase on central, harbour and western line; what will be the impact? ✓				
4.	What is your opinion about noise and vibration on existing railway system and due to proposed development activity? ✓				
5.	The skywalk, footpath and parking are proposed by Railway under proposed development activity? Is that essentially required? <u>yes</u>				
6.	What are the grievances about (Land, Shop, Trees, Livelihood), due to proposed development activity and what is your opinion for the Grievance Redressal Mechanism? ✓				
7.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1.	Increase in income	✓	1.	Loss of livelihood	X
2.	Reduce headway due to CBTC <u>Not relevant to Neral</u>		2.	Passenger load at stations due to CBTC <u>Not relevant to Neral</u>	
3.	Mitigation of Noise & Vibration	<u>Not Req</u>	3.	Impact on Noise & Vibration	✓
4.	Decrease the air pollution load		4.	Impact on trees	✓
5.	Better and fast connectivity	<u>busy</u>	5.	Chances of accidents	
6.	Increase in Customers	✓	6.	Loss in income	
7.	Increase accessibility to facilities	✓	7.	Structural loss	
8.	Decrease in accidents	✓	8.	Loss of customers and supplies	
9.	Increase in employment	✓	9.	Disruption of social/cultural/economic harmony	
10.	Decrease in migration		10.	Religious/sites and networks	✓

11.	Increase in property value		11.	Decrease in value of properties	
12.	Industrial Development and Networking	✓	12.	Increase in accidents	↗
13.	Improvement in transportation system	✓	13.	Increase in crime rates	✓
14.	Increase in Education level	✓	14.	Increase in Migration	✓
15.	Station specific DMP (Disaster Management Plan)	<u>Not reqd</u>	15.	Existing safety of Indian railway	—
16.	Others Specify	✓	16.	Others Specify	—


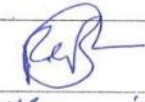
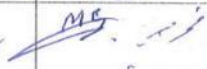

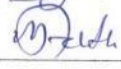


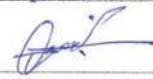


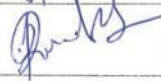

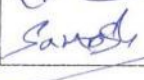
ISSUES IDENTIFIED AND DISCUSSED IN PUBLIC CONSULTATIONS:

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
1.	Trees-	IF cut trees, more trees will be planted Some trees are very old Not possible to transplant	
2.	Noise and vibration	No Noise pollution anticipated at the station. No vibration.	
3.	Treespassing -	The station is facilitated with only one FOB, people will follow trespassing	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Remarks
	<p>→ NO facility for handicap person</p> <p>→ No toilet and bathroom at platform</p> <p>→ Drinking water facility is available</p>		
4.	<p>→ "Matheran"</p>	<p>^{near} The station is nearest Railway station to Matheran - so develop for tourist station</p>	
5.	<p>→ Taxi services →</p>	<p>Tourists are very important because they are not given for local. only taxi stand for Matheran.</p> <p>→ taxi stand is required</p> <p>→ very happy and</p>	
6.		<p>welcome the project</p>	

S. No	Issues raised/Discussed	Participant Suggestions/ comments	Re

DETAILS OF PARTICIPANTS:-

S. No	Name of Participants	Sex	Age	Occupation	Signature
1.	S. M. shedge	M	57	CBS	
2.	Harish chandru	M		stain manager	
3.	prakalpa patil	M	38	employee	
4.	Mohib sheikh	M	73	tailor	
5.	Ganesh Thorge	M	43		
6.	mahesh m Jalur	M	27	saltary	
7.	Joyashana Khadkekar	F	38	B.Z.	J.S. Khadkekar
8.	Shilpa	F	31	-	-
9.	Mahesh Gayakwad	M	35	B.Z	
10.	-			Merual taxi union	
11.	Rajendra. shivram Kolhy	M	52	taxi driver	
12.	Tausif Sarole	M	40	taxi driver	
13.	yashwant. Uithy. Mon	M	45	taxi driver	
14.	Narendra Ramesh Mon	M	36	taxi driver	
15.	Ravindra Anha Vehale	M	50	taxi driver	
16.	Santosh babu singam	M	39	taxi driver	Santosh
17.	Kiran Kamalakar Bhoir	M	41	taxi driver	
18.	Senthesh Naik	M	36	taxi driver	

Public Consultation

Date: 18/12/20

Place: Vasai P.

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income		1	Loss of livelihood	
2	Increase in Customers		2	Loss in Income	
3	Increase accessibility to facilities		3	Structural loss	
4	Decrease in accidents		4	Loss of customers and supplies	
5	Increase in employment		5	Disruption of social/cultural/economic	
6	Decrease in migration		6	Religious/sites and networks	
7	Increase in property value		7	Decrease in value of properties	
8	Industrial Development and Networking		8	Increase in accidents	
9	Improvement in transportation system		9	Increase in crime rates	
10	Increase in Education level		10	Increase in Migration	
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
	Com.		
1)	Relocation	we have to find our replacement house and get it at a distance of 500m.	
2)	livelihood	In rehabilitation we will have no home to live in after leave our homes and we will all be homeless.	
3)	Compensation & Allowances	we should get a house for house & shop for shop.	

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
4.	Decision making	we make all decision in the house together	
5.	Access to Facilities	There should be necessity of life and communication facilities.	
6.	safety during Travel	There should be no Pot-holes on the road and proper signals for reason of safety.	
7.	Employment generation	our employment, occupation and jobs should be kept at 500m distance from Rehabilitation.	

List of Participants

S. No	Name of Participants	Sex	Age	Occupation	Signature
1)	Rajesh datashankar shing	M	41	Business	
2)	Santosh	M	38	Business	
3)	Jagdish Nikam	M	65	Business	
	Hire	M	60	Business	
4)	Motilal Nandlal Khadare	M	40	Business	
5)	Siddesh Ashokrao Bosale	M	35	Business	
6)	Radhesham Tadar	M	41	Business	
7)	Santosh Shetake	M	27	Business	
8)	Dilip shing	M	45	Business	

Public Consultation

Date: 18/12/20 Place: Vasai

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in Income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in Income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
8.	Special facilities women	keep 24Hrs securities for ladies and add extra compartment for ladies.	
9.	Regular Info. on project	We have been given all ideas/informations about upcoming project through surveyours.	
10.	women safety during Travels	security guards should be set up at all station for womens.	

Public Consultation

Date: 20/12/20

Place: Mumbai Central.

Sr. No	Perception about the Project	Yes	No	Remarks	
1.	Do you think it is necessary to upgradation of 19 suburban stations and implementation of CBTC on Mumbai suburban sections?				
2.	What impacts, both positive and negative of the project do you foreseen?				
S. No	Positive Impact	Yes-1 No-2	S. No	Negative Impact	Yes-1 No-2
1	Increase in income	1	1	Loss of livelihood	1
2	Increase in Customers	1	2	Loss in Income	1
3	Increase accessibility to facilities	1	3	Structural loss	1
4	Decrease in accidents	1	4	Loss of customers and supplies	1
5	Increase in employment	1	5	Disruption of social/cultural/economic	1
6	Decrease in migration	1	6	Religious/sites and networks	1
7	Increase in property value	1	7	Decrease in value of properties	1
8	Industrial Development and Networking	1	8	Increase in accidents	1
9	Improvement in transportation system	1	9	Increase in crime rates	1
10	Increase in Education level	1	10	Increase in Migration	1
11	Others Specify		11	Others Specify	

Issues

S. No	Issues raised/ Discussed	Participant Suggestions/ comments	Remarks
1.	Relocation	we have to find our re-placement house and get it at a distance of 1 km.	
2.	Livelihood	In rehabilitation we will have no home to live in after leave our homes and we will all be homeless.	
3.	Compensation & Allowances	we should get a house for house and shop for a shop.	

Annexure 9.3: Summary of Public Consultation

Location: Kandivali			
Date & Time: 05.12.2020 at 4.30 hrs at Visa Sarothia Niwas, Kandivali (W)		Type of Stakeholders: Mixed Group	Number of Participants: 35
Date & Time: 25.12.2020 at 4.30 hrs at Kandivali Station		Type of Stakeholders: Auto drivers Group	Number of Participants: 14
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Census and socio-economic survey	The tenants of Visa Sarothia Niwas were explained by RITES social team about how to fill up the questionnaire for socio-economic survey.	Noted
2.	Awareness about proposed project	The RITES social team have informed the tenants and general public about MUTP projects and its benefits. The participants reported that they are happy with the improvement of railway station and additional amenities proposed at the station premises.	Noted
3.	Compensation	The participants reported that the compensation to tenants should be e-credited to their accounts directly.	Noted
4.	Compensation for plot	The participants reported that the plot under acquisition falls under commercial zone. The tenants demanded that compensation should be provided as per the commercial rate, if their land gets acquired due to the proposed project. The plot is located within 1 Meter from the station and all the facilities like vegetable market, post office, transportation (train, auto, bus, airport, taxi) are available nearby easily. Moving out of premises will cause hardship and loss of business.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
5.	Loss of business	The participants reported that all the commercial offices, shops, small businesses will suffer financially due to loss of business. The daily footfall in the area is around 5 Lakh persons	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act

Location: Kandivali			
Date & Time: 05.12.2020 at 4.30 hrs at Visa Sarothia Niwas, Kandivali (W)		Type of Stakeholders: Mixed Group	Number of Participants: 35
Date & Time: 25.12.2020 at 4.30 hrs at Kandivali Station		Type of Stakeholders: Auto drivers Group	Number of Participants: 14
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		per day. The participants (Auto Drivers) reported that their complete family dependent on auto rickshaw business, if they will get more passengers their income will be more.	2013 of Gol. Auto rickshaw business is not likely to be affected as the passengers to the station will continue to be same.
6.	Relocation site	The tenants requested that if the relocation site is made available for them then it should be located within 500 Meters from the current location.	The relocation site will depend on the availability of the plot and R&R site finalized by MMRDA
7.	Benefits for vulnerable group	The participants reported that apart from compensation the government should provide special benefits to the unemployed, widows, person/family affected by MUTP project.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
8.	Pollution due to construction	The participants (Auto Drivers) feels that very less pollution is anticipated due to proposed development activity because heavy machinery not will be used during the construction.	Appropriate mitigation measures shall be adopted to mitigate the impact of air/noise pollution.
9.	Trees, Noise and Vibration	The participants reported that <ul style="list-style-type: none"> ➤ Trees should be saved, if possible. ➤ The area becomes noisy during peak period. They are habitual about the train Noise and Vibration.	Affected trees if any will be transplanted as per the policy of BMC.

Location: Chembur			
Date & Time: 13.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 10
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The shop keepers responded that they would need shop in the same area even after relocation.	The relocation site for commercial will depend on the availability of the shops at R&R site finalized by MMRDA
2.	Livelihood	Due to acquisition, the shop keepers may lose livelihood, which in turn will affect their family as well.	Compensation will be provided for loss of livelihood as per the Entitlement matrix following the procedure detailed in LARR Act 2013 of Gol.
3.	Compensation & Allowances	As part of compensation, people would like to have better house and shops.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Access to Facilities	The participants reported that the resettlement sites should be well equipped with all sorts of basic facilities along with connectivity.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
5.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safe entry/exit from stations have been incorporated in the station layout/design.
6.	Employment Generation	The resettlement sites should be near to their shops as well as job locations. So that they do not lose their customers.	The relocation site will depend on the availability of the shop and R&R site finalized by MMRDA
7.	Women Safety During Travel	The female respondents demanded to have 24X7 female security guard and CCTV cameras to be installed in the train.	Measures for safety at stations have been addressed in the station design. Safety

Location: Chembur			
Date & Time: 13.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 10
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			measures in the train will be provided as per the guidelines of western railways.
8.	Health & Education Facilities to Children Plan.	The resettlement sites should have Schools, hospitals, roads and better-quality education and travelling services.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location: NallaSopara			
Date & Time: 15.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 16
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The shop keepers responded that they would need shop in the same area even after relocation.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	Due to acquisition, the shop keepers may lose livelihood, which in turn will affect their family as well.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	As part of compensation, people would like to have better house and shops.	Compensation for will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Access to Facilities	The participants reported that the resettlement sites should be well equipped with all sorts of basic facilities along with connectivity.	Basic amenities will be provided at R&R sites as per the procedure details in

Location: NallaSopara			
Date & Time: 15.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 16
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			RFCTLARR Act 2013 of Gol.
5.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safe entry/exit from stations have been incorporated in the station layout/design.
6.	Employment Generation	The resettlement sites should be near to their shops as well as job locations. So that they do not lose their customers.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
7.	Women Safety During Travel	The female respondents demanded to have 24X7 female security guard and CCTV cameras to be installed in the train.	Measures for safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
8.	Health & Education Facilities to Children Plan.	The resettlement sites should have Schools, hospitals, roads and better-quality education and travelling services.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location: Bhandup			
Date & Time: 15.12.2020 at 15.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 16
Date & Time: 15.12.2020 at 16.00 hrs		Type of Stakeholders: Female Group, Auto-Drivers and Station Manager of Bhandup Station	Number of Participants: 27
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The shop keepers responded that they would need shop in the same area even after relocation.	The relocation site will depend on the availability of the shops, plot and

Location: Bhandup			
Date & Time: 15.12.2020 at 15.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 16
Date & Time: 15.12.2020 at 16.00 hrs		Type of Stakeholders: Female Group, Auto-Drivers and Station Manager of Bhandup Station	Number of Participants: 27
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			R&R site finalized by MMRDA
2.	Livelihood	<p>Due to acquisition, the shop keepers may lose livelihood which in turn will affect their family as well.</p> <p>The participants (Auto Drivers) reported that their family is completely dependent on auto rickshaw business, If they get more passengers their income will be more.</p>	<p>Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.</p> <p>Auto rickshaw business is not likely to be affected as the passengers to the station will continue to be same.</p>
3.	Compensation & Allowances	As part of compensation, people would like to have better house and shops.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Access to Facilities	The participants reported that the resettlement sites should be well equipped with all sorts of basic facilities along with connectivity.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
5.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safe entry/exit from stations have been incorporated in the station layout/design.
6.	Employment Generation	The resettlement sites should be near to their shops as well as job locations.	The relocation site will depend on the

Location: Bhandup			
Date & Time: 15.12.2020 at 15.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 16
Date & Time: 15.12.2020 at 16.00 hrs		Type of Stakeholders: Female Group, Auto-Drivers and Station Manager of Bhandup Station	Number of Participants: 27
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		So that they do not lose their customers.	availability of the shops, plot and R&R site finalized by MMRDA
7.	Women Safety During Travel	The female respondents demanded to have 24X7 female security guard and CCTV cameras to be installed in the train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
8.	Health & Education Facilities to Children Plan.	The resettlement sites should have Schools, hospitals, roads and better-quality education and travelling services.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
9.	Noise & Vibration	The participants reported that they are staying near railway station for many years and they are habitual about noise and vibration generated by running train.	Appropriate mitigation measures shall be adopted to mitigate the impact of air/noise pollution.
10.	Trees	The participants feel that trees are noise pollution absorbent and pollution sink. Instead of cutting, the trees should be transplanted.	Affected trees if any will be transplanted as per the policy of BMC.

Location: Mira Road			
Date & Time: 16.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 5
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents wanted shops in same area after Rehabilitation. The	The relocation site will depend on the

Location: Mira Road			
Date & Time: 16.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 5
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		resettlement sites should be provided within 1km from the existing house and commercial units.	availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The acquisition due to the proposed project may lead to loss of livelihood	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The respondents opted house for house and shop for shop.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	It is reported that both male and female members take decisions together at household level.	
5.	Access to Facilities	Unlike existing facility, all sorts of basic facilities should be available at the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the station layout/design.

Location: Mira Road			
Date & Time: 16.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 5
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
7.	Employment Generation	The participants reported that the occupation & shops should be provided near to the resettlement site. A minimum distance should be maintained.	
8.	Special Facilities for Women in Train	The respondents requested female security guard at all Stations to Keep 24hrs security for ladies. It is demanded during consultation that an additional two compartments should be available for ladies in train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Awareness about project	The participants were informed about the proposed project development during consultation.	Noted
10.	Health & Education Facilities to Children Plan.	School, Hospital, roads, religious institutions, children's park should be available near to the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location: Mulund			
Date & Time: 16.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 20
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents wanted shops in same area after Rehabilitation. The resettlement sites should be provided within 1km from the existing house and commercial units.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The acquisition due to the proposed project may lead to loss of livelihood	Compensation for loss of livelihood will be provided as per the Entitlement

Location: Mulund			
Date & Time: 16.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 20
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The respondents opted house for house and shop for shop.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	It is reported that both male and female members take decisions together at household level.	
5.	Access to Facilities	Unlike existing facility, all sorts of basic facilities should be available at the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project would enhance the existing safety measures for passengers in stations.	Essential provisions for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The participants reported that the occupation & shops should be provided near to the resettlement site. A minimum distance should be maintained.	
8.	Special Facilities for Women in Train	The respondents requested female security guard at all Stations to Keep 24hrs security for ladies. It is demanded during consultation that an additional two compartments should be available for ladies in train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Awareness	The participants were informed about	

Location: Mulund			
Date & Time: 16.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 20
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
	about project	the proposed project development during consultation.	
10.	Health & Education Facilities to Children Plan.	School, Hospital, roads, religious institutions, children's park should be available near to the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location: Govandi			
Date & Time: 17.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 21
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents wanted shops in same area after Rehabilitation. The resettlement sites should be provided within 1km from the existing house and commercial units.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The acquisition due to the proposed project may lead to loss of livelihood	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The respondents opted house for house and shop for shop.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	It is reported that both male and female members take decisions together at household level.	Noted
5.	Access to Facilities	Unlike existing facility, all sorts of basic facilities should be available at the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in

Location:Govandi			
Date & Time: 17.12.2020 at 10.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 21
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The participants reported that the occupation & shops should be provided near to the resettlement site. A minimum distance should be maintained.	
8.	Special Facilities for Women in Train	The respondents requested female security guard at all Stations to Keep 24hrs security for ladies. It is demanded during consultation that an additional two compartments should be available for ladies in train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Awareness about project	The participants were informed about the proposed project development during consultation.	Noted
10.	Health & Education Facilities to Children Plan.	School, Hospital, roads, religious institutions, children's park should be available near to the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location:GTB Nagar			
Date & Time: 17.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 24
Date & Time: 26.12.2020 at 11.30 hrs		Type of Stakeholders: Female Group & Commercial station manager	Number of Participants: 08
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks

Location:GTB Nagar			
Date & Time: 17.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 24
Date & Time: 26.12.2020 at 11.30 hrs		Type of Stakeholders: Female Group & Commercial station manager	Number of Participants: 08
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents wanted shops in same area after Rehabilitation. The resettlement sites should be provided within 1km from the existing house and commercial units. In GTB Nagar station, it is reported that the project affected households are already been rehabilitated to the resettlement site under the development of a different project.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The acquisition due to the proposed project may lead to loss of livelihood.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of GoI.
3.	Compensation & Allowances	The respondents opted house for house and shop for shop.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of GoI.
4.	Decision Making	It is reported that both male and female members take decisions together at household level.	Noted
5.	Access to Facilities	Unlike existing facility, all sorts of basic facilities should be available at the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of GoI.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been

Location:GTB Nagar			
Date & Time: 17.12.2020 at 14.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 24
Date & Time: 26.12.2020 at 11.30 hrs		Type of Stakeholders: Female Group & Commercial station manager	Number of Participants: 08
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			incorporated in the station layout/design.
7.	Employment Generation	The participants reported that the occupation & shops should be provided near to the resettlement site. A minimum distance should be maintained.	
8.	Special Facilities for Women in Train	The respondents requested female security guard at all Stations to Keep 24hrs security for ladies. It is demanded during consultation that an additional two compartments should be available for ladies in train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Awareness about project	The participants were informed about the proposed project development during consultation.	Noted
10.	Health & Education Facilities to Children Plan.	School, Hospital, roads, religious institutions, children's park should be available near to the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
11.	Trees	The participants feel that instead of cutting, the trees should be transplanted.	Affected trees if any will be transplanted as per the policy of BMC.
12.	Noise & Vibration	The participants reported that they are habitual with railway noise and now they are rehabilitated to the resettlement site under the development of a different project.	Appropriate mitigation measures shall be adopted to mitigate the impact of air/noise pollution.

Location:Mankhurd

Date & Time: 17.12.2020 at 17.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 15
Date & Time: 24.12.2020 at 11.30 hrs		Type of Stakeholders: Residential and Female Hawkers Group	Number of Participants: 25
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents wanted shops in same area after Rehabilitation. The resettlement sites should be provided within 1Km from the existing house and commercial units	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The acquisition due to the proposed project may lead to loss of livelihood. The female hawkers situated near the east side of the railway station are reported that they require money if they lose their livelihood.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The respondents opted house for house and shop for shop.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	It is reported that both male and female members take decisions together at household level.	Noted
5.	Access to Facilities	Unlike existing facility, all sorts of basic facilities should be available at the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The participants reported that the occupation & shops should be provided near to the resettlement site. A	

Location: Mankhurd			
Date & Time: 17.12.2020 at 17.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 15
Date & Time: 24.12.2020 at 11.30 hrs		Type of Stakeholders: Residential and Female Hawkers Group	Number of Participants: 25
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		minimum distance should be maintained.	
8.	Special Facilities for Women in Train	The respondents requested female security guard at all Stations to Keep 24hrs security for ladies. It is demanded during consultation that an additional two compartments should be available for ladies in train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Awareness about project	The participants were informed about the proposed project development during consultation.	
10.	Health & Education Facilities to Children Plan.	School, Hospital, roads, religious institutions, children's park should be available near to the resettlement site.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
11.	Trees	The participants feel that instead of cutting, the trees should be transplanted.	Affected trees if any will be transplanted as per the policy of BMC.
12.	Noise & vibration	The participants reported that they are not feeling any adverse impact due to current noise and vibration.	Appropriate mitigation measures shall be adopted to mitigate the impact of air/noise pollution.
13.	Trespassing	The participants reported that trespassing is the major problem at station premises, and they suggested fencing should be done throughout the station.	FOB has proposed for a safe crossing of passengers and frequent announcement will be made to use it for safety purpose

Location: Neral			
Date & Time: 18.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 23.12.2020 at 12.30 hrs		Type of Stakeholders: Taxi Drivers and Shop Owners	Number of Participants: 19
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	<p>The respondents reported that if their houses and shops get acquired then they should be relocated within 1 km from their current location.</p> <p>One participant reported that they are having the shops for many years and they should not provide their shops for the proposed development activity at any cost. Once a business is established in an area, it might get difficult to establish it again in another area.</p>	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The proposed project should lead to loss of livelihood and houses. The affected families would not have place to stay.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The participants reported that they would prefer house for house and shop for shop as rehabilitation and resettlement option.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	The respondents shared that both male and female together take family decisions.	Noted
5.	Access to Facilities	During discussion, the participants shared that they should need to have access to basic facilities such as market, school, college, hospital, community properties, sanitation facility etc.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance	Necessary provisions

Location: Neral			
Date & Time: 18.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 23.12.2020 at 12.30 hrs		Type of Stakeholders: Taxi Drivers and Shop Owners	Number of Participants: 19
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		the existing safety measures for passengers in stations.	for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The respondents reported that the job and other occupational opportunities should be available at a minimum distance from relocation site.	
8.	Special Facilities for Women in Train	There should be 24 hrs CCTV & Securities for ladies. Another two compartments should be added for ladies in the train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Regular Information on Projects	The participants were unaware about the station improvement project. During consultation they were informed about it.	Project progress will be updated on MRVC website regularly
10.	Women Safety During Travel	Security guards should be available for emergency of women at every station.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
11.	Health & Education Facilities to Children Plan.	Health and educational facilities should be available at the relocation site for their children.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location: Neral			
Date & Time: 18.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 23.12.2020 at 12.30 hrs		Type of Stakeholders: Taxi Drivers and Shop Owners	Number of Participants: 19
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
12.	Collie Service//Taxi stand/parking	The participants reported that due to non-availability of collie service/Taxi stand/parking near railway station, tourist should face problems and scrolling the luggage up to 1km. They suggested that 4-wheeler parking should also be part of this proposed development activity and start collie service at railway station.	Station improvement design has considered this suggestion
13.	Toilet	The participants reported that deficiency of toilet at railway station and suggested sufficient toilet facility should also be part of this proposed development activities.	Station improvement design has considered this suggestion
14.	Trespassing	The participants reported that trespassing is the major problem at station premises, and they suggested fencing should be done throughout the station.	FOB has proposed for a safe crossing of passengers and frequent announcement will be made to use it for safety purpose

Location: Vasai			
Date & Time: 18.12.2020 at 15.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 25.12.2020 at 15.00 hrs		Type of Stakeholders: Auto drivers and Station manager	Number of Participants: 10
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents reported that if their houses and shops get acquired then they should be relocated within 1 km from their current location.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The proposed project should lead to loss of livelihood and houses. The affected	Compensation for loss of livelihood will

Location: Vasai			
Date & Time: 18.12.2020 at 15.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 25.12.2020 at 15.00 hrs		Type of Stakeholders: Auto drivers and Station manager	Number of Participants: 10
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		families would not have place to stay.	be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The participants reported that they would prefer house for house and shop for shop as rehabilitation and resettlement option.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	The respondents shared that both male and female together take family decisions.	Noted
5.	Access to Facilities	During discussion, the participants shared that they should need to have access to basic facilities such as market, school, college, hospital, community properties, sanitation facility etc.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The respondents reported that the job and other occupational opportunities should be available at a minimum distance from relocation site.	
8.	Special Facilities for Women in Train	There should be 24 hrs CCTV & Securities for ladies. Another two compartments shall be added for ladies	Measures for women safety at stations

Location: Vasai			
Date & Time: 18.12.2020 at 15.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 8
Date & Time: 25.12.2020 at 15.00 hrs		Type of Stakeholders: Auto drivers and Station manager	Number of Participants: 10
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
		in the train.	have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Regular Information on Projects	The participants were unaware about the station improvement project. During consultation they were informed about it.	Project progress will be updated on MRVC website regularly
10.	Women Safety During Travel	Security guards should be available for emergency of women at every station.	Measures for women safety at stations have been addressed in the station planning and design.
11.	Health & Education Facilities to Children Plan.	Health and educational facilities should be available at the relocation site for their children.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
12.	Trees	The participants feel that instead of cutting, the trees should be transplanted.	Affected trees if any will be transplanted as per the policy of BMC.
13.	Noise & vibration	The participants reported that they are not feeling any adverse impact due to current noise and vibration.	Appropriate mitigation measures shall be adopted to mitigate the impact of air/noise pollution.
14.	Elevators	The participants suggested that elevators should also be provided in this project to facilitate elderly citizens.	Design consideration may be considered by MRVC

Location: **Kandivali**

Date & Time: 20.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 30
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents reported that if their houses and shops get acquired then they should be relocated within 1 km from their current location.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The proposed project should lead to loss of livelihood and houses. The affected families would not have place to stay.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The participants reported that they would prefer house for house and shop for shop as rehabilitation and resettlement option.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	The respondents shared that both male and female together take family decisions.	Noted
5.	Access to Facilities	During discussion, the participants shared that they should need to have access to basic facilities such as market, school, college, hospital, community properties, sanitation facility etc.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the

Location: Kandivali			
Date & Time: 20.12.2020 at 10.30 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 30
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
			station layout/design.
7.	Employment Generation	The respondents reported that the job and other occupational opportunities should be available at a minimum distance from relocation site.	
8.	Special Facilities for Women in Train	There should be 24 hrs CCTV & Securities for ladies. Another two compartments should be added for ladies in the train.	Measures for women safety at stations have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Regular Information on Projects	The participants were unaware about the station improvement project. During consultation they were informed about it.	Project progress will be updated on MRVC website regularly
10.	Women Safety During Travel	Security guards shall be available for emergency of women at every station.	Measures for women safety at stations have been addressed in the station planning and design.
11.	Health & Education Facilities to Children Plan.	Health and educational facilities should be available at the relocation site for their children.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.

Location:**Mumbai Central**

Date & Time: 20.12.2020 at 15.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 11
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
1.	Relocation	The respondents reported that if their houses and shops get acquired then they should be relocated within 1 km from their current location.	The relocation site will depend on the availability of the shops, plot and R&R site finalized by MMRDA
2.	Livelihood	The proposed project should lead to loss of livelihood and houses. The affected families would not have place to stay.	Compensation for loss of livelihood will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
3.	Compensation & Allowances	The participants reported that they should prefer house for house and shop for shop as rehabilitation and resettlement option.	Compensation will be provided as per the Entitlement matrix following the procedure detailed in RFCTLARR Act 2013 of Gol.
4.	Decision Making	The respondents shared that both male and female together take family decisions.	Noted
5.	Access to Facilities	During discussion, the participants shared that they should need to have access to basic facilities such as market, school, college, hospital, community properties, sanitation facility etc.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.
6.	Safety During Travel	The participants feel that the station improvement project should enhance the existing safety measures for passengers in stations.	Necessary provisions for safety of passengers at stations have been incorporated in the station layout/design.
7.	Employment Generation	The respondents reported that the job and other occupational opportunities should be available at a minimum distance from relocation site.	
8.	Special Facilities for Women in	There should be 24 hrs CCTV & Securities for ladies. Another two	Measures for women safety at stations

Location: Mumbai Central			
Date & Time: 20.12.2020 at 15.00 hrs		Type of Stakeholders: Residential & Commercial Mixed Group	Number of Participants: 11
S. No	Issues	Views/Opinion, Concerns	MRVC Remarks
	Train	compartments should be added for ladies in the train.	have been addressed in the station design. Safety measures in the train will be provided as per the guidelines of western railways.
9.	Regular Information on Projects	The participants were unaware about the station improvement project. During consultation they were informed about it.	Project progress will be updated on MRVC website regularly
10.	Women Safety During Travel	Security guards should be available for emergency of women at every station.	Measures for women safety at stations have been addressed in the station planning and design.
11.	Health & Education Facilities to Children Plan.	Health and educational facilities should be available at the relocation site for their children.	Basic amenities will be provided at R&R sites as per the procedure details in RFCTLARR Act 2013 of Gol.