

# Environment and Social Due Diligence Report

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January 2014

## IND: Accelerating Infrastructure Investment Facility in India –MEP Infrastructure Private Limited

Prepared by

India Infrastructure Finance Company Limited for the Asian Development Bank

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## IIFCL

### Due diligence Report on Environment and Social Safeguards

**Sub Project: “Securitization of five Mumbai Entry Points along with maintenance of flyovers and allied structures”**



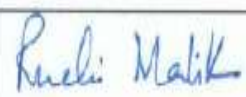

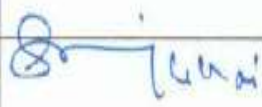
**Project Developer: MEP Infrastructure Private Limited**



**January 2014**

**Sub Project: Securitization of five Mumbai Entry Points along with  
maintenance of flyovers and allied structures**

**Due Diligence Report on Environment and Social Safeguards**

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## **PROJECT BACKGROUND:**

### **1. PROJECT TITLE:**

1. The Project scope included Operation, maintenance of 27 flyovers, capacity augmentation of Mulund (EEH), Mulund (LBS) & Vashi Toll plazas, O & M of five Toll Plazas Mumbai Entry Points including toll collection at prescribed rates for Contract / Concession period.

### **2. PROJECT DESCRIPTION:**

2. Maharashtra State Road Development Corporation Limited (MSRDC) had invited bids in July 2009 to undertake implementation of "Securitization of five Mumbai Entry Points along with maintenance of 55 flyovers and allied structures. The five entry points as shown in **Figure 1** are at following locations:
  - Vashi on Sion-Panvel Highway (SPH)
  - Mulund on Lal Bahadur Shastri Road (LBS)
  - Mulund on Eastern Express Highway (EEH)
  - Airoli Bridge on Airoli Mulund Road
  - Dahisar on Western Express Highway (WEH)
3. As per the Contract Agreement, the project scope includes Collection of Toll at five Mumbai Entry Points at prescribed rates along with operation and maintenance of 27 flyovers and allied structures.
4. It also includes augmentation of toll plaza at Mulund (EEH) by construction of 4 additional lanes, construction of 8 lane toll plaza with office building at Mulund (LBS) and construction of staggered toll plaza at Vashi. Also, fully furnished site office for MSRDC as well as Independent Engineer shall also be provided at least at 2 locations having an area not less than 650 sq. ft.
5. During the operations phase, Contractor needs to provide maintenance under:
  - Routine Maintenance.
  - Periodic Maintenance.
  - Special Repairs / Structural repairs

### **3. CONCESSIONAIRE:**

6. Maharashtra State Road Development Corporation Limited (MSRDC) has appointed M/s. MEP Infrastructure Private Limited as the concessionaire for this project. MSRDC issued Letter of Award (LoA) on October 28, 2010 and Contract Agreement between MSRDC and MEPIPL was executed on November 19, 2010.

**Figure 1: Project site map showing Five toll stations at Mumbai Entry Points**

● Site Map Showing Five Toll stations at Mumbai Entry Points

**4. INDEPENDENT CONSULTANT:**

7. M/s S.N. Bhole & Associates Pvt. Ltd. has been appointed as the independent consultant for the project by MSRDC.

**5. IIFCL FUNDING:**

8. The total funding requirement envisaged for this project was Rs. 2121 crore. The project has been financed by IIFCL under Takeout Finance Scheme. MEP Infrastructure Private Limited has signed the Takeout Agreement on 8th March 2013 with India Infrastructure Finance Company Ltd. (IIFCL). IIFCL has committed Rs 400 Crores and has already disbursed the whole amount to MEP Infrastructure Private Limited.

## **DUE DILIGENCE ON ENVIRONMENTAL SAFEGUARDS**



## 6. DOCUMENTS REVIEW FOR ENVIRONMENTAL SAFEGUARDS DUE-DILIGENCE:

9. The Environmental safeguard due-diligence study was carried out for the project on the basis of site visit observations and understanding project scope based on information and documents provided by Concessionaire. The following documents were referred in order to prepare Environmental Safeguards Due-Diligence Report:

- Project Information Memorandum (PIM);
- Maintenance Manual for Entire Concession Period of Airoli Bridge Corridor ;
- Common Loan Agreement signed between Concessionaire and Lenders;
- Concession Agreement signed between Concessionaire and MSRDC.

## 7. VISIT TO PROJECT LOCATION:

10. As part of the preparation of the Environment and Social Due Diligence Report (ESDDR), the project was visited by the Environmental and Social safeguard specialists of IIFCL along with ADB's Fact Finding Mission Team on 31st of May, 2013 for field verification of Environmental safeguards related aspects of project site and consultation with the O&M Team of concessionaire was also done regarding their scope of safeguards practices & implementation. The project is currently in operation phase. The site visit photographs are given in **Photo Plate-I**.
11. The work commencement order of "Securitization of Five Mumbai Entry Points along with maintenance of Flyovers and allied structures in and around Mumbai Region" was issued to Concessionaire-MEPIPL (M/s. MEP Infrastructure Pvt. Ltd.) by MSRDC with effect from 20.11.2010 for a 16 years Concession period. The Project consists of maintenance of 27flyovers, 5 Pedestrians subways, 5 Toll plazas, 4 Junctions and 1 Creek Bridge which are constructed under 55 – flyover project on various Corridors.

## 8. PROJECT SCOPE OF WORK:

12. The Project Facility will be operated and maintained the by Concessionaire or through sub-Contractors if required, modify, repair or otherwise make improvements to the Project / Project Facility to comply with Specifications and Standards, and other requirements. Following activities comprise the scope of works on Maintenance as per the specifications and MSRDC Concession Agreement:
- (i) ensuring smooth and uninterrupted flow of traffic during normal operating conditions;
  - (ii) Undertaking routine housekeeping work like cleaning of signage/crash barriers keeping carriageway free from encumbrances etc.
  - (iii) Charging, collecting and appropriating Toll Fee in accordance with approved norms by MSRDC and O & M Contract.
  - (iv) Minimizing disruption to traffic in the event of accidents or other incidents affecting the safety and use of the Project / Project Facility by providing a rapid and effective response and for this purpose maintaining liaison with emergency services.

- (v) Undertaking routine maintenance including prompt repairs of potholes, drains, line marking, and signage.
- (vi) Undertaking maintenance works in accordance with Maintenance Manual and the Maintenance Programme.
- (vii) Providing surveillance team / adequate security arrangement to safeguard all the corridor assets fixed as well as mobile.
- (viii) Preventing with the assistance of the concerned law enforcement agencies where necessary, any encroachments on the Project / Project Site and preserving the right of way of the Project.
- (ix) Adherence to the Safety Standards.
- (x) Maintaining complaint/suggestion register at toll plazas, deputing officer to check the implementation of the necessary suggestions by road users.

## **9. ENVIRONMENTAL SENSITIVITY AND DUE DILIGENCE:**

13. The project scope of work is collection of Toll at prescribed rates from five Mumbai Entry Points along with operation and maintenance of 27 flyovers and allied structures and augmentation and maintenance of toll plazas. The environmental sensitivity of the project has been assessed by reviewing the project documents along with Maintenance Manual, supplemented by field visit and consultation with the concessionaire. The environmental sensitivity assessment is given below:

- As confirmed by Project developer that no forest or notified eco-sensitive area has been impacted by project facility;
- There is no loss of bio-diversity as there are no known rare, threatened or endangered flora and fauna species near and within the project facility;
- There are no archeological monuments and sites within corridor of impact for this project facility;
- In this urban project, no road side trees were present, median plantation was seen to be present at some of road sections and wherever possible on Toll Plaza & alongside of ramps of flyovers also;
- It was observed during site visit that within the RoW , cultural properties as well as other Government properties/facilities have not been affected due to this project facility;
- Operation and Maintenance in concession period will consist of maintenance of entire project to keep it in operational condition as per standards and specifications. The maintenance of the project can be classified as: (i) Routine Maintenance (ii) Periodic Maintenance (iii) Special Repairs/ Structural Repairs;

- In Routine maintenance a group of recurrent activities related to repair of faults and attention to the road, structure and facilities to ensure the preservation of the asset and convenience and safety of traffic. Periodic Maintenance includes the activities related to each element and the system as a whole of the project highway to ensure that during the concession period and at its end, the project facility is in sound, durable and in functional condition. Under special repairs activity, if any repair is found to be necessary during inspection, then these are carried out, e.g. special repairing of BT/Concrete surfaces, renewal treatment for thermoplastic painting & road markings etc.
- As informed by project developer, system has been developed for addressing public grievances largely related to road/pavement distress and traffic & safety concerns at Toll Plazas;
- As mentioned in maintenance manual, Various types of reporting systems are in place for recording various activities under O&M stage of project facility which includes Maintenance reports submission to Independent Consultant, Monthly Progress reports to MSRDC, Annual reports on the working of Toll Collection Systems, Periodic Accident reports, Quarterly O&M reports, Daily Surveillance reports submission to MSRDC ;
- As defined in maintenance manual, the concessionaire has undertaken the implementation of environment management and health safety measures as per agreed terms with MSRDC which mainly includes watering of plantation, rehabilitation, replantation and maintenance of well growth of existing plants, suitable disposal of different kind of waste materials generated due to various maintenance activities at project site, work & labour safety practices, road & traffic safety measures etc. during the operation stage of the project;

## **10. CATEGORIZATION OF PROJECT:**

14. The project can be classified as category “B” based upon ADB’s EA requirements as per their Safeguard Policy Statement (2009). This classification is based on the review of the scope of work for project facility during operation phase and other available documents, field verifications of the project with respect to the environmental sensitivity among others.

## **11. STATUS OF REGULATORY CLEARANCES:**

15. As informed by project developer during site visit, all the applicable statutory clearances from competent authorities were obtained by MSRDC during pre-construction/construction stage of project. Concessionaire’s responsibility is only to operate and maintain the constructed facility during concession period of 16 years.

## **12. PUBLIC GRIEVANCE REDRESSAL MECHANISM:**

16. For dealing with public issues related with toll operations, Concessionaire informed during site visit that a dedicated resource is assigned on job, for addressing public grievances largely related to road/pavement distress and traffic & safety concerns at Toll Plazas. This person is responsible for collecting feedback and maintaining a complaint register with necessary particulars. The feedback is further highlighted to concern team members for required action. All complaints related to road Maintenance are resolved by undertaking necessary repairs. Toll related matters are directed to the concerned staff members.

## **13. IMPLEMENTATION OF ENVIRONMENT MANAGEMENT AND HEALTH SAFETY MEASURES DURING OPERATION PHASE:**

17. As part of the scope of work during O&M phase, Concessionaire is undertaking following measures under environment management and health & safety initiatives at work site during operation phase:
- Landscaping Maintenance;
  - Solid Waste Management;
  - PPE's for labors at work;
  - Material spillage Management due to accidents;
  - Noise Barriers at sensitive locations;
  - Institutional arrangement for Site Safety;
  - Road Safety Signage and road furniture;
  - Traffic Safety Measures;
18. Document showing Photographs related with Plantation, labour safety and road furniture & signage as provided by Concessionaire is attached as **Appendix-I** which also includes certain measures under environment management and health & safety initiatives at work site during operation phase:

### **13.1. CONTRACTUAL OBLIGATIONS DURING O&M PHASE:**

19. Concession Agreement has been signed between MEPIPL and MSRDC on November 19, 2010 upon upfront payment by MEPIPL to MSRDC. As informed by concessionaire, general guidelines towards "Protection of the environment" are listed under Volume (I), Chapter 4, Clause 31 of agreement for which concessionaire abide by the same during Operations and compliance with Labour Laws is mentioned under Clause 40. As per the Contract Agreement, the project scope includes Collection of Toll at five Mumbai Entry Points at prescribed rates along with operation and maintenance of 27 flyovers and allied structures. During the operations phase, Contractor needs to provide maintenance under (i) Routine Maintenance (ii) Periodic Maintenance (iii) Special Repairs / Structural repairs. As informed by Concessionaire, O&M Manuals has been prepared for all the entry points (Toll Plaza locations) and sample copy of the Airoli Bridge Corridor is provided by Concessionaire which

is attached as **Annexure-II**. This Plaza location was visited jointly by Safeguards team of IIFCL and ADB.

20. Concessionaire's scope of work is defined in Chapter No. 2 of this document which is focused on activities related with Operation & Maintenance and monitoring & supervision during Operations phase. Maintenance classification criterion is well defined activity wise in Chapter No. 3. For smooth operation of project facilities, inspection program with objective and frequency of inspection has also been detailed out. Safety and Traffic Management related details during operation phase are given under Chapter no. 4 which also includes Emergency Response Protocol. Recording and reporting obligations on part of concessionaire with MSRDC has been described under Chapter No. 5 which includes various kind of reporting obligations like daily, monthly, quarterly and annual reporting to MSRDC.

### **13.2. ROAD SAFETY AND TRAFFIC MANAGEMENT PLAN**

21. As informed by Concessionaire, Road and Traffic Safety measures are being implemented as defined in maintenance manuals of road corridors. As defined in maintenance manual for Airoli Bridge Corridor, its mentioned that Concessionaire will maintain Traffic Flows and Traffic Control, provision of traffic signage, upkeeping of work signboards and cones etc. Concessionaire will ensure that all the site staff working adjacent to the carriageway must wear safety vest/jacket. Traffic & safety procedures have been defined for dealing with emergency situations, taking action against activities such as encroachments, structures within RoW, operation and management of accidents/incidents. Maintenance program, Report formats, Traffic Diversion and Lane closure schemes are enclosed in Maintenance Manual.

### **13.3. EMERGENCY PREPAREDNESS AND RESPONSE PLAN**

22. As informed by Concessionaire, Emergency Response procedures are defined in Maintenance Manual and are being implemented. The provision of a standby/on-call/monitoring team of persons will be on standby/on-call for emergency for removals of fallen tree/obstacles/debris, attendance of accident/breakdown, provide the traffic management, etc. The plants/equipment which are to be deployed during emergencies should include all equipment such as Lorries, chainsaw, oxy-acetylene cutter, jack, hammer, digital camera, etc. Other machineries (crane, shovel, backhoe etc) will be made available on site round the clock. The response time for such request will not exceed 45 minutes whenever possible. The cost of deployment of these machineries will be borne by MEP infrastructure Pvt Ltd. Concessionaire will carry out emergency maintenance and repairs as may be required to repair the damages and ensure that project facilities are returned to normal operating standards as quickly as possible.
23. As reported in Independent Consultant's Monthly Progress Report for the month of June 2013, all the highways under the project scope are divided into three corridors,(i) Sion Panvel Corridor (ii) Western Expressway (iii) Eastern Expressway , LBS & Airoli for which there are three corridor incharges for dealing with any kind of emergency situation and three utility vehicles are provided. Everyday patrolling in all corridors is done and corridor incharges &

junior engineers/supervisors are available on 24 hour mobile facility for attending any emergency and required immediate action. All concerned disaster management Dept. phone numbers are available at Airoli office, utility vehicles and all Toll Plazas for better and fast communication.

#### **13.4. ACCIDENT-INCIDENT REPORTING:**

24. In the event of occurrence of any accident on the project highway involving a fatality or serious personal injury or substantial property damage, the concessionaire investigates the circumstances of such accident as soon as practicable and in any event not later than 7 days following the occurrence of accident. Concessionaire submits to MSRDC and Independent Consultant, a report setting out details of such accident and, to the extent, they are known, the causes of such an accident and any other additional details like any emergency help provided. These reports are very important to understand the implementation of safety measures on the highway and planning of any improvement if the need arises based on the cause of accidents. Accident Data sheets of May 2013 month for Eastern Express Highway Corridor, Western Express Highway Corridor, Sion Panvel Corridor, LBS and Airoli Corridor are attached as **Annexure-III**. The accident data sheet report covers details of date/time of accident, class of vehicle & nature of injury.

#### **13.5. PLANTATION AND ITS MAINTENANCE:**

25. Landscaping Maintenance will encompass duties and requirement which will form an obligatory part on the Concessionaire to perform works as may be necessary to recondition, rehabilitate, replace and replant, maintain and ensure well growth of existing plants. As per maintenance manual, Landscaping maintenance will normally cover the areas like Toll Plaza, Administrative & operation maintenance base, Junctions, loop and interchanges and Median Plantations or the areas as directed by MSRDC/ IE. Landscaping and beautification works will include the maintaining of civil works, watering to trees, plants and shrubs daily, pruning, grass cutting, replacement of plants and shrubs and cleaning of sit outs, lawns, pergolas and artifacts etc.

#### **13.6. INSTITUTIONAL FRAMEWORK FOR SITE SAFETY MANAGEMENT:**

26. MSRDC has appointed the Independent Consultant(IC) for carrying out audit of the project highway in accordance with the different regulatory requirements and shall take all other actions necessary for securing compliance with these requirements. During operation, the concessionaire have taken reasonable steps regarding site safety to avoid damage or nuisance to persons or to property of the public arising as a consequence of their method of operation. From the concessionaire end, Safety Division is deployed which is controlled by the Chief Engineering officer through Project Manager. Safety Division comprises of safety Coordinator, safety monitoring officers and safety assistant. As informed by Concessionaire, Work & Labour Safety compliance is monitored by the safety incharge and his team. Monitoring mechanism includes regular inspections and checklists. Periodic safety meetings

are conducted to understand safety concerns and drawing out response plan. The Organization Chart of the site safety team of concessionaire is attached as **Annexure-IV**.

#### 14. SITE VISIT OBSERVATIONS:

27. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists along with ADB's Safeguards Fact Finding Mission Team on 31st May, 2013 to review the implementation of the project safety & environmental safeguards. During the site visit, it has been observed that:

- It was observed during site visit that Plantation at Toll Plaza & Administrative buildings, Road Junctions and at Median places has been done for this project for which maintenance is regularly carried out by Concessionaire.
- Labors doing repairing work/ painting and cleaning at work site were seen wearing safety jackets/boots/helmets and other PPE's as required.
- Road and Traffic safety related signage have been provided throughout the Highways Corridors.
- The drainage system on highways is periodically cleaned so as to ensure adequate storm water flow. During site visit, labors were seen cleaning the drainage pipes.
- As informed by Concessionaire, they organize seminars on "site and labour safety" twice in a year, as a part of their safety initiative.
- During site visit, concessionaire informed that Dismantled and waste material during O&M phase is disposed off in a suitable manner at a suitable place in accordance with the applicable law or as per directives of MSRDC/IE.
- Road and Traffic Safety measures like Road studs, Road markings, Sign boards, Delineators, Hazard markers, Metal beam crash barriers, Blinkers, Highway Lighting, Various message sign boards, Highway patrolling, Emergency Vehicles are provided and maintained by Concessionaire during Operations phase.
- At Toll Plaza, CCTV cameras for traffic monitoring and First Aid Boxes were provided. Non-conventional energy, i.e. solar light utilization has been done for operation of CCTV cameras and blinkers on the highway which are chargeable with battery system.

28. The site visit photographs regarding the site safety and environmental safeguard measures implemented during operation phase are given in **Photo Plate-I**.

#### 15. CONCLUSIONS AND RECOMMENDATION:

29. Based upon the available documents and site visit, it is concluded that the concessionaire has well maintained the highway corridor and also has undertaken adequate road and traffic

safety measures for smooth flow of traffic and environmental safeguard measures as required to implement during operation phase of any highway project. The conclusions for the project are given below:

- The project has been prepared by MSRDC as per its own funding requirement and not in anticipation to ADB operation.
- As informed by Concessionaire during site visit, all the required national and local level environmental clearances as well as permits and approvals for project implementation were obtained by MSRDC who has constructed these highway Corridors. The concessionaire is only maintaining the highway corridors, complying with contractual obligations undertaken with MSRDC and collecting toll collection.
- Concessionaire has also confirmed that for routine maintenance activities during O&M Phase, their sub-contractors are obtaining applicable statutory environmental clearances/consents and continued compliance is being carried out with the terms & conditions stipulated in obtained statutory environmental clearances/consents.
- The Operation and maintenance of these highway corridors has no major significant environmental impacts.
- The institutional arrangement has been done for supervision, monitoring and maintenance of site and work safety by Concessionaire.
- Based on the site visits and due diligence findings, it can be deduced that the project has no significant environmental safeguard issues.



## **DUE DILIGENCE ON SOCIAL SAFEGUARDS**

**16. DUE DILIGENCE OF SOCIAL IMPACTS:**

30. The Social safeguard due diligence study for MEP Infrastructure Private Limited has been done based on the review Project Information Memorandum, discussion with the concessionaire and site visit observation. A site visit was made by the Environment and Social Safeguards Specialist from IIFCL and ADB on 31<sup>st</sup> May 2013.

**17. LAND ACQUISITION IN THE PROJECT:**

31. As discussed with the concessionaire during the site visit, the project does not involve any land acquisition. The project scope includes Collection of Toll at five Mumbai Entry Points at prescribed rates along with operation and maintenance of 27 flyovers and allied structures.

**18. RESETTLEMENT IMPACT IN THE PROJECT:**

32. As discussed with the concessionaire during the site visit, the project does not have any impact on any private, religious or community structures. The project is already under operation and no construction activities are involved in the project. The scope of work only includes the maintenance of the flyovers.

**19. IMPACT ON INDIGENOUS PEOPLE:**

33. As informed by the concessionaire, no family is getting affected due to the project as the project was handed over to the concessionaire while it was already in the operation stage.

**20. GRIEVANCE REDRESSAL MECHANISM**

34. As informed by the concessionaire, a dedicated resource is assigned on job, for addressing public grievances largely related to road/pavement distress and traffic & safety concerns at Toll Plazas. The concerned person is responsible for collecting feedback and maintaining a complaint register with necessary particulars. The feedback is further highlighted to concern team members for required action. As informed by the concessionaire, all complaints related to road Maintenance are resolved by undertaking necessary repairs. Toll related matters are directed to the concern staff members.
35. Encroachments particularly, for the space below flyovers are brought to the notice of MSRDC by means of formal written communication. Further action from the concessionaire is initiated as per directives received from MSRDC/ Independent Engineer. A Copy of communication regarding a request made to the concerned authority for the removal of unauthorized encroachment under the Mankhurd Underpass is attached as **Appendix-V**.

## 21. CSR ACTIVITIES:

36. During the site visit, it was informed by the concessionaire that they are involved in various community development activities for different companies under the Group. Their initiatives are drawn with key focus on improving quality and standard of living of the society.

## 22. SITE VISIT OBSERVATION:

37. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists along with ADB's Safeguards Fact Finding Mission Team on 31<sup>st</sup> May, 2013 to review the implementation of social safeguards measures in the project. The site visit photographs are given in **Photo Plate-I**. During the site visit it was observed that:

- The project scope only involves the maintenance of the flyovers and no new construction is being done.
- The safety measures were being taken by the contractors and the workers were noted to be using the required PPEs during the maintenance work on one of the flyovers.
- As informed by the concessionaire, the project does not involve any land acquisition and there is no displacement due to the project.
- It was informed by the concessionaire that there are no pending litigation issues for the project.

## 23. CONCLUSION AND RECOMMENDATIONS:

38. Based upon the available documents and the site visit it is concluded that:

- The project has been prepared by MSRDC as per its own funding requirement and not anticipation to ADB operation.
- The project does not involve any land acquisition and there are no issues of displacement due to the project.
- Local labour is being engaged in the construction activities for skilled as well as unskilled activities.
- The project therefore does not appear to involve reputational risk to Asian Development Bank funding on social safeguards and recommended for funding under the proposed project.

## **IMPLEMENTATION OF ENVIRONMENT MANAGEMENT AND HEALTH SAFETY MEASURES DURING OPERATION PHASE**

MEP Infrastructure Private Limited undertakes following measures under Environment Management and Health & Safety initiatives at work site during operation phase:

### **Environment Management**

Beautification of space below flyovers has been done on the below mentioned Corridors. Photographs of Beautification under various flyovers are pasted below.

SPH Corridor – Nerul Flyover (Completed)

WEH Corridor – Aarey Flyover (Completed), Filmcity Flyover, Dattapada & National Park (Work in progress)

EEH /LBS Corridor – Sion Flyover/Gandhinagar (Work in progress)

Airoli Bridge – Along the median.



Space below Nerul Flyover – SPH Corridor





Space below Aarey Flyover – WEH Corridor



Airoli Bridge Corridor – Median plantation

Following steps are taken towards routine maintenance & upkeep of plantation:

- Regular watering.
- Seeding & Control of insects.
- Application of manure four times in a year.
- Ensure that no roots are subjected to adverse conditions such as prolonged exposure to drying or subjections to waterlogging.

### **Labour & Road Safety**

Includes Providing PPE's for site labour, Road signages & Road furniture.

Following steps are taken towards ensuring safety of labour at site, safety during major works & for general safety of road users.

- Physical separation of 1.5m between work area and highway traffic is maintained by installing traffic cones or orange drums or any other specified barricades.
- During resurfacing/renewal activity; carried out usually in the night hours when the flow of traffic is less, manually controlled entrances and exits are designated to facilitate smooth operations. Police permission is taken well in advance to enable uninterrupted work execution.
- Adequate number of traffic signs are provided along the flyovers indicating speed limit, no overturning, sharp curve , go slow etc.
- Safety during night time is ensured by;
  1. Providing light barriers along the central median to prevent cross glare.
  2. Regular inspection of street lights is done to ensure each unit is functional at all times.
  3. Cat eyes/ delineators are provided in adequate nos. on all flyovers and at toll plaza locations.
  4. Reflective cones are installed at bridge approaches on either sides.



Photographs:

**Labour Safety**



Safety jackets



Barricade separating work & traffic area



Dedicated person standing with a red flag for traffic diversion.



### Road Furniture & Signages



Delineators/ guard poles at toll plaza



Delineators/ guard poles on flyover for lane separation.



Barricade along road curves





Direction signs



Cautionary sign



Cautionary sign



Speed limit