



MINISTRY OF RAILWAYS
DFCC of India Ltd. (DFCCIL)

Western Corridor of the DFC Project between Vadodara and Rewari Summary of the Environmental Impact Assessment

August 2009



This summary explains outline of environmental and social considerations for Western Corridor of the Dedicated Freight Corridor (DFC) Project between Vadodara and Rewari as first priority section of the Dedicated Freight Corridor in India, as per the final Environmental Impact Assessment (EIA) report approved by Ministry of Railway (MOR) in August, 2009. This summary is distributed to the public as an information disclosure process under the project by responsible bodies; MOR as competent ministry and Dedicated Freight Corridor Corporation of India Limited (DFCCIL) as project executing agency.

Outline of the Project

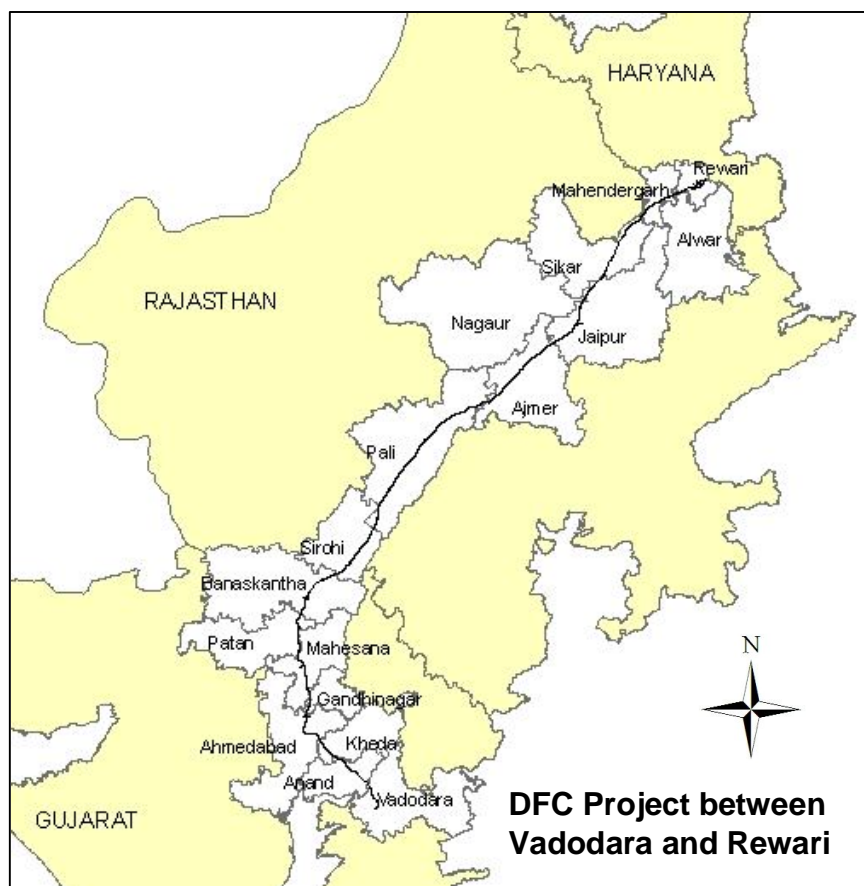
Ministry of Railway is implementing Computerized Multi Modal High Axle Load Dedicated Freight Corridor Project (DFC Project) to facilitate speedier and smooth transportation of bulk goods without any interruption between the two metropolises Delhi and Mumbai and their respective hinterlands at lesser transport cost and lesser time.

DFC Project aims to help boosting the present trends of growth of the economy in India. It is designed to carry a total freight line of 37.7 million tones in the fiscal year 2013-2014. At the same time, it is anticipated that the construction of DFC would induce economic development, generate employment and above all improve economic integration of regions in the country with improved links among major economic and trade centres.

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) under Ministry of Railways, Government of India is an executing agency for the development of DFC. DFC Project in the Western Corridor between Vadodara and Rewari passes through approx. 447 villages in 17 districts of three states; Haryana, Rajasthan and Gujarat. Length of the proposed alignment is approximately 920 km.

The project is now under planning stage. Detailed design will start in the end of 2009 for about 2 years. Project implementation / construction work is scheduled after 2011 for 4-5 years.

State / District
Gujarat
Vadodara
Anand
Kheda
Ahmedabad
Gandhinagar
Mahesana
Patan
Banaskantha
Rajasthan
Sirohi
Pali
Ajmer
Jaipur
Nagaur
Sikar
Alwar
Haryana
Mahendragarh
Rewari



Proposed DFC Alignment and Facilities

Western Corridor of the DFC Project subject to implementation is traversing Vadodara – Ahmedabad – Palanpur – Rewari as double track. The proposed alignment passes through the states of Gujarat, Rajasthan and Haryana. In principle, the alignment for the DFC Project was designed as parallel to the existing railway within the land of Indian Railways. However, some sections where there is no enough land along the existing railway are designed as detour route to avoid resettlement as much as possible. Alignment for detour route of the DFC Project was designed, considering avoidance of local communities, wildlife sanctuary, city planning area, marble stone factories, residential area, large excavation, etc. to minimize environmental and social impacts as possible.

Environmental and Social Considerations Study for the Project

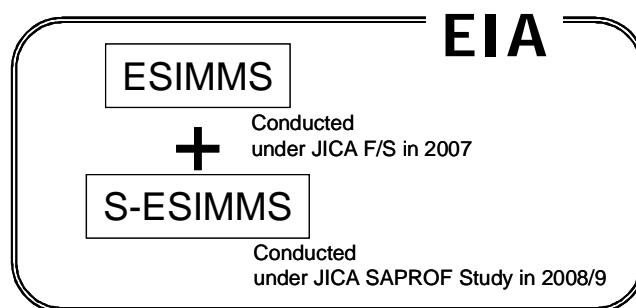
There is no provision of the Environmental Impact Assessment (EIA) for railway development under the Indian laws and regulations. However, since the DFC Project is the large-scale project which would cause large and various environmental and social impacts such as noise pollution and involuntary resettlement, comprehensive examinations on environmental and social considerations for the railway development have been carried out for the DFC Project from the planning stage of the development.

Under the situation, MOR/DFCCIL has prepared EIA for the Western Corridor of the DFC Project between Vadodara and Rewari under technical support by the Japan International Cooperation Agency (JICA), which are composed of ESIMMS¹

conducted under the JICA Feasibility Study in 2007 and S-ESIMMS² conducted under the JICA SAPROF³ Study in 2008/9. EIA report is composed of state-wise ESIMMS reports for 3 states and S-ESIMMS report covering whole project area.



Field survey on flora



Both ESIMMS and S-ESIMMS covered impacts potentially induced from nature of the project, physical and social conditions of the project sites for natural environment, pollution control, and social issues. In the S-ESIMMS, further detailed studies were conducted such

¹ ESIMMS: Environmental and Social Impact Mitigation Measures Study as EIA Level Study under the JICA Guideline for Environmental and Social Considerations, 2004.

² S-ESIMMS: Supplementary ESIMMS

³ SAPROF: Special Assistance for Project Formulation

as detailed prediction of the railway noise and vibration as well as sensitive receptor⁴ and land use surveys, detailed survey for the protected area nearby DFC alignment and major rivers to cover data for all seasons, and survey on structures to be relocated and further socio-economic survey, in addition to supplementary surveys for area which is newly affected due to change of alignment after the JICA F/S.



**Noise measurement survey
along the existing railway**

Potential Impacts and Mitigation Measures

Various environmental and social impacts were identified through the series of the surveys. Mitigation measures are proposed to minimize the environmental and social impacts which are unavoidable as a result of examination. Mitigation measures for major items of the environmental and social impacts are shown below.

List of Potential Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures
Air Quality	
< Construction Phase >	
Deterioration of air quality due to particulate matter such as dust, especially during dry condition, and gaseous emissions from construction equipment and vehicular traffic	<ul style="list-style-type: none"> ➤ Storage of construction materials in covered godowns or enclosed spaces ➤ Coverage of truck carrying soil, sand and stone to avoid spilling ➤ Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads and vulnerable areas of the construction sites ➤ Use of low emission construction equipment, vehicles and generator sets
Noise and Vibration Levels	
< Construction phase >	
Noise and vibration due to movement of vehicles, and operation of light and heavy construction machineries	<ul style="list-style-type: none"> ➤ Use of low noise construction equipment ➤ Construction activities carried out near residential area preferably in daytime ➤ Provision of protective gears such as ear plugs etc. to construction personnel exposed to high noise levels
< Operation Phase >	
Noise and vibration due to movement of trains and related facilities	<ul style="list-style-type: none"> ➤ New technologies incorporated to lower noise and vibration generation with respect to structures and rolling stocks ➤ Use of long welded rails ➤ Appropriate maintenance of locomotives, tracks and structures.
Water Quality	
< Construction phase >	
<ul style="list-style-type: none"> • Wastewater from construction activities with suspended impurities • Wastewater disposal from the workers camp and sludge generated from construction sites 	<ul style="list-style-type: none"> ➤ Provision of silt fencing near water bodies ➤ Control of quality of construction wastewater emanating from the construction site through suitable drainage system with sediment traps ➤ Provision of proper sanitation facilities at the construction site to prevent health related problems due to water contamination
< Operation Phase >	

⁴ Sensitive facility is public facility, which is sensitive to the noise and vibration impacts, such as hospital, school, and religious facilities.

Potential Impacts	Mitigation Measures
Wastewater generated from rail depot, train washing, heavy cleaning, workshops and maintenance activities	➤ Reuse of treated water by removal of suspended solids, oil and grease, organic matter, toxic elements and neutralization of pH through waste water treatment plant
Topography and Geology	
< Construction stage >	
<ul style="list-style-type: none"> • Change in topography due to clearing of land, felling of trees, cutting and filling of land and construction of structures • Disfigurations of topography due to indiscriminate digging of borrow pits. 	<ul style="list-style-type: none"> ➤ Use of only identified borrow pits and quarry sites to avoid any disfiguration of topography ➤ Avoidance of uncontrolled digging of borrow pits to prevent water accumulation in abandoned pits resulting in breeding ground of vector disease ➤ Procurement of construction materials from existing approved and licensed quarries only
Soil	
< Construction stage >	
<ul style="list-style-type: none"> • Disruption and loss of productive top soil from agricultural fields due to creation of borrow pits and development of detour section • Loosening of top soil and loss of vegetative cover due to excavation and back filling • Deterioration of soil quality 	<ul style="list-style-type: none"> ➤ Utilization of fly ash, if technically suitable and available within 100 km distance of the DFC alignment for construction of embankment to save soil resource ➤ Adequate measures like adequate drainage, embankment consolidation and slope stabilization ➤ Conservation and restoration of top soils of the borrow pit sites ➤ Avoidance of accidental spills ➤ Proper disposal of used bentonite slurry
Hydrological Conditions	
< Construction stage >	
Increased incidence and duration of floods due to obstruction of natural drainage courses by the embankment	<ul style="list-style-type: none"> ➤ Provision of adequate drains along the track ➤ Augmentation of capacity of existing drainage works ➤ Provision of adequate drainage works for smooth passage of runoff to avoid flooding and formation of water pool.
< Operation stage >	
Impact to local drainage due to formation of railway embankment	➤ Provision of longitudinal drains of sufficient capacity on both sides of the track to accommodate increased run-off.
Flora	
< Construction stage >	
Loss of flora due to felling of trees along the ROW	<ul style="list-style-type: none"> ➤ Appropriate compensatory plantation with about 2 times of the number of trees felled ➤ Compensation for forest land and trees to be felled in forest area and private land ➤ Mixed plantation consisting of flowering shrubs and evergreen ornamental trees
Deposition of fugitive dust on pubescent leaves of nearby vegetation	<ul style="list-style-type: none"> ➤ Strip plantation in available open spaces on both sides of the railway track ➤ Provision of cooking fuel to construction workers to avoid cutting/felling of trees for fuel wood
Diversion of Forest Land	
< Pre-construction stage >	
The alignment passes through several patches of Reserved Forest and open forest area	<ul style="list-style-type: none"> ➤ Compensation shall be provided to the forest department towards the cost of forest land to be diverted and cost of compensatory afforestation. ➤ Before start any activity within the Reserved Forest area, Forest clearance must be obtained.
Fauna	
< Pre-construction stage >	
Thol Wildlife (Bird) Sanctuary in the west of DFC alignment (detour section) in Mahesana District.	➤ Construction activity within 3 km radius of sanctuary shall be carried out by taking special care so as to cause the least disturbance as per the provisions of the law
< Construction stage >	
Disturbance to avifauna in reserved forests and Thol Wildlife (Bird) Sanctuary due to noise generated from construction machinery	➤ All the construction equipment and vehicles used shall be in good working condition, properly lubricated and maintained to keep noise within the permissible limits and engines turned off when not in use to reduce noise.

Potential Impacts	Mitigation Measures
Temporary loss of habitat of Indian Soft-shell Turtle and Mugger Crocodile during bridge construction over Mahi, Vishwamitri, and Vatrak Rivers	<ul style="list-style-type: none"> ➤ Construction of bridge shall be constructed during dry season but working may resorted in monsoon if it does not affect the habitat of endangered species. ➤ Provision of fencing along the boundary of construction site as per site requirement
< Operation stage >	
Disturbance of corridor of wildlife movement due to acquisition of Reserved Forest Land in Banaskantha District	➤ Initiation of appropriate compensatory plantation to compensate the habitat loss due to felling of trees for site clearing.
Effect on aquatic fauna in case of accidental oil spill and toxic chemical release into water bodies	➤ Contingent actions for speedy cleaning up of oil spills, fuel and toxic chemicals in the event of accidents
Restriction of the movement of wildlife on either side of the track	➤ Provision of animal underpasses for wildlife near forest areas
Collision of wildlife with train	➤ Provision of fencing, if feasible, along DFC in wildlife habitat concentration areas to avoid collision.
Land Acquisition and Resettlement	
< Pre-construction stage >	
Loss of livelihood and properties	➤ Compensation and assistance package will be planned in the Rehabilitation and Resettlement Plan (RRP), separately from the EIA.
< Construction stage >	
Disturbance of vehicle traffic and pedestrian (farmers) passage	➤ Provision of detour with adequate sign board and instruction
< Operation stage >	
Regional severance and disturbance of movement for local people and farmers due to embankment structure of the DFC	<ul style="list-style-type: none"> ➤ Provision of road-under-bridge (RUB) or road-over-bridge (ROB) at road crossing as per the policy and need. ➤ Existing road and proposed RUB/ROB/Level Crossing (LC) will cater for the movement of local people. ➤ Underpass or the level crossing shall be provided in the detour section as per the existing road network. ➤ Provision of footpath on side of the carriageway as per existing practice of the Indian Railway Code (IRC)

Note: Major impact items and mitigation measures are shown in the table. Further impact items and mitigation measures are shown in the EIA report.

Environmental Management Plan

Environmental Management Plan (EMP) is the key to ensure a safe and clean environment. The expected results from the environmental mitigation measures proposed in the project may not be obtained without a management plan to assure its proper implementation and function. The EMP envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts arising out of the project activities during pre-construction, construction and operation stages. EMP is prepared addressing the issues as follows.

- 1) The following Specific Environment Management Plans are proposed.
 - a) Greenbelt Development Plan
 - b) Solid Waste Management Plan
 - c) Management / Rehabilitation Plan for Quarry / Borrow Areas
 - d) Guidelines for Sanitation and House Keeping at the Construction Labour Camps
 - e) Procedures for Storage, Handling & Emergency Response for Hazardous Chemical
 - f) Land Acquisitions and Resettlement (Rehabilitation and Resettlement Plan for the project will cover this issue, separately from the EIA report.)
- 2) Stage-wise Environmental Management Measures are proposed for the following environmental and social issues.
 - a) Pre-construction stage
 - Land acquisition, diversion of reserved forest land, preservation of trees, borrow area, quarry area, site identification for disposal of unsuitable materials, construction camp, arrangement for temporary yard, orientation of implementation agency and contractors
 - b) Construction stage
 - Site clearance, procurement of construction materials, construction work (drainage, siltation, slope protection, etc.), water pollution, air pollution, noise, safety, labour camp management, contractor's demobilization (clean-up operation, restoration and rehabilitation)
 - c) Operation stage
 - Monitoring of operation performance of various mitigation measures, pollution monitoring

Environmental Monitoring

The purpose of the environmental monitoring plan is to ensure that the envisaged purpose of the project is achieved and results in desired benefits to the target population. To ensure the effective implementation of the EMP, it is essential that an effective monitoring plan be designed and carried out. The environmental monitoring plan consists of performance indicators and environmental monitoring programme.

Performance indicators

- 1) Pre-construction stage: land acquisition, dumping locations, construction camps, borrow areas;
- 2) Construction stage: air quality, noise & vibration levels, water quality, tree plantation, top soil, construction workers;
- 3) Operation stage: survival rate of trees, rehabilitation of borrow areas, utility of noise barriers for sensitive receptors

Environmental monitoring programme

For the following items of environmental items, a) parameters to be monitored, b) location of the monitoring sites, c) frequency and duration of monitoring, and d) institutional responsibilities for implementation and supervision.

- Air quality, water quality, noise and vibration level, soil erosion, plantation, flora and fauna

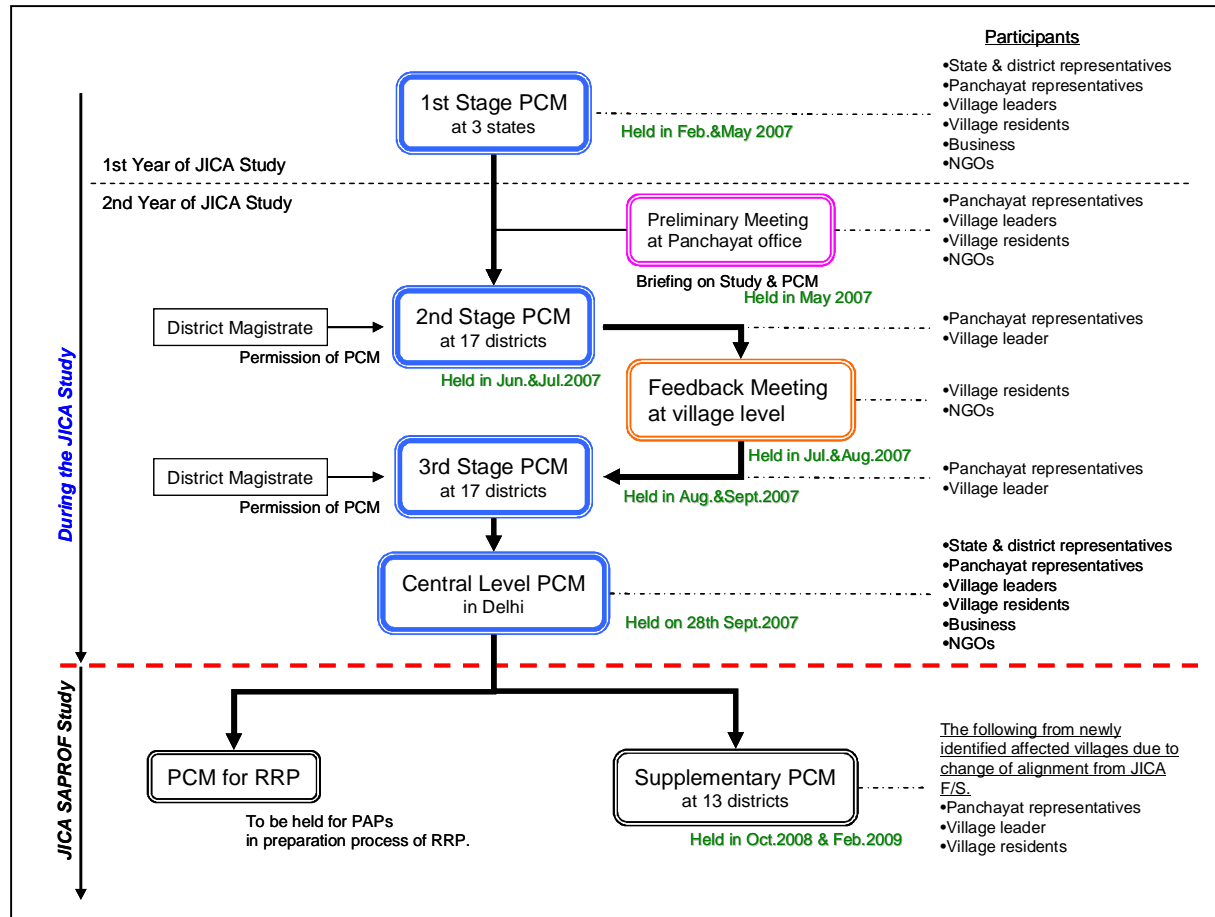
Public Consultation Meeting

Series of the Public Consultation Meetings (PCMs) were held during the ESIMMS under the JICA-funded Feasibility Study to disclose project information to as well as to get opinions and comments from the public. In addition, additional district-wise PCMs were held during the S-ESIMMS under the JICA funded SAPROF Study targeting for newly identified project-affected villages due to change of design of DFC alignment after the JICA F/S. Various comments and opinions were collected through the PCMs and incorporated into the project design such as provision of culvert to make vehicles, residents, and farmers access smoothly for both sides of the embankment section of the DFC.

On the other hand, PCMs for Rehabilitation and Resettlement Plan (RRP) are separately conducted in preparation process of the RRP to disclose to and obtain comments and opinions from project-affected peoples subject to the land acquisition and resettlement (PAPs).



Public Consultation Meeting



Information Disclosure in Preparation Process of EIA

As an information disclosure process in the preparation of the EIA report, sets of the EIA report for the project, which consists of the ESIMMS reports for three states and S-ESIMMS report, were disclosed to the public in the area along the proposed DFC alignment with its summary between the middle of March and middle of April in 2009.

During the disclosure process of the draft EIA reports, nearly 70 comments were collected from the public. Among these comments, there are no specific comments to be incorporated in the EIA report. These are mainly land acquisition, rehabilitation, and resettlement issues. However, these comments will be taken care of in further examination and implementation of mitigation measures and Environmental Management & Monitoring Plan in further stage of the project. In addition, L&A and R&R issues will be taken care of at the time of preparation and implementation of Rehabilitation and Resettlement Plan in further stage of the project as well.

Further Schedule

- Engineering Services for the further deliberation of the project design will be started in the end of 2009 for about 2 years. The unit working for environment and social considerations will prepare detailed planning of mitigations measures and Environment Management & Monitoring Plan. The comments above will be scrutinized in specified locations.
- Construction work will be started after 2011.
- Commercial operation will be started by 2015 / 2016.

Availability of Reports

- Full set of the Final approved EIA report, which is composed of the state-wise ESIMMS reports and Final S-ESIMMS report will be available for review by the public in the following locations where the draft EIA report was disclosed; respective Chief Project Manager (CPM) offices of DFCCIL, major stations along the proposed DFC alignment, and respective District Offices, in October and November, 2009, as well as summary of the finalized EIA report in all of the project-affected villages.

Address of the CPM offices of the DFCCIL

- CPM office in Jaipur
B-12, Hanuman Nagar, Opp. Metro Hospital, Sirsi Road, Jaipur, Tel: 0141-4028741, Fax: 0141-4028740
- CPM office in Ajmer
42A/3 Civil Line, Ajmer-305001, Tel/Fax: 0145-2625548
- CPM office in Ahmedabad
1st Floor, Old DRM Office Building, Kalupur, Ahmedabad-380002, Tel: 079-22175107, Fax: 079-22163101
- CPM office in Vadodara
13-14, 17-18, Panorama Complex, 3rd Floor, R.C. Dutt Road, Alkapuri, Vadodara-7, Tel: 0265-2326024, Fax: 0265-2326027

Major Stations where the Final EIA report is available

- Gujarat
Palanpur (Jn), Siddhapur, Unjha, Mahesana(Jn), Sabarmati (Jn), Ahmedabad (Jn), Nadiad (Jn), Anand(Jn) Vasad (Jn), Vadodara (Jn)
- Rajasthan
Alwar (Jn), Kund, Neem Ka Thana, Sri Madhopur, Ringus (Jn), Jaipur (Jn), Phulera (Jn), Kishangarh, Ajmer (Jn), Beawar, Sojat Road, Marwar Jn, Falna, Sirohi Road, Abu Road
- Haryana
Rewari (Jn), Narnaul, Dabla (Jn)

Thank you very much for your cooperation for the project.

